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DEC 6 1949
December 5, 1949

STEEL

The Magazine of Metalworking and Metalproducing

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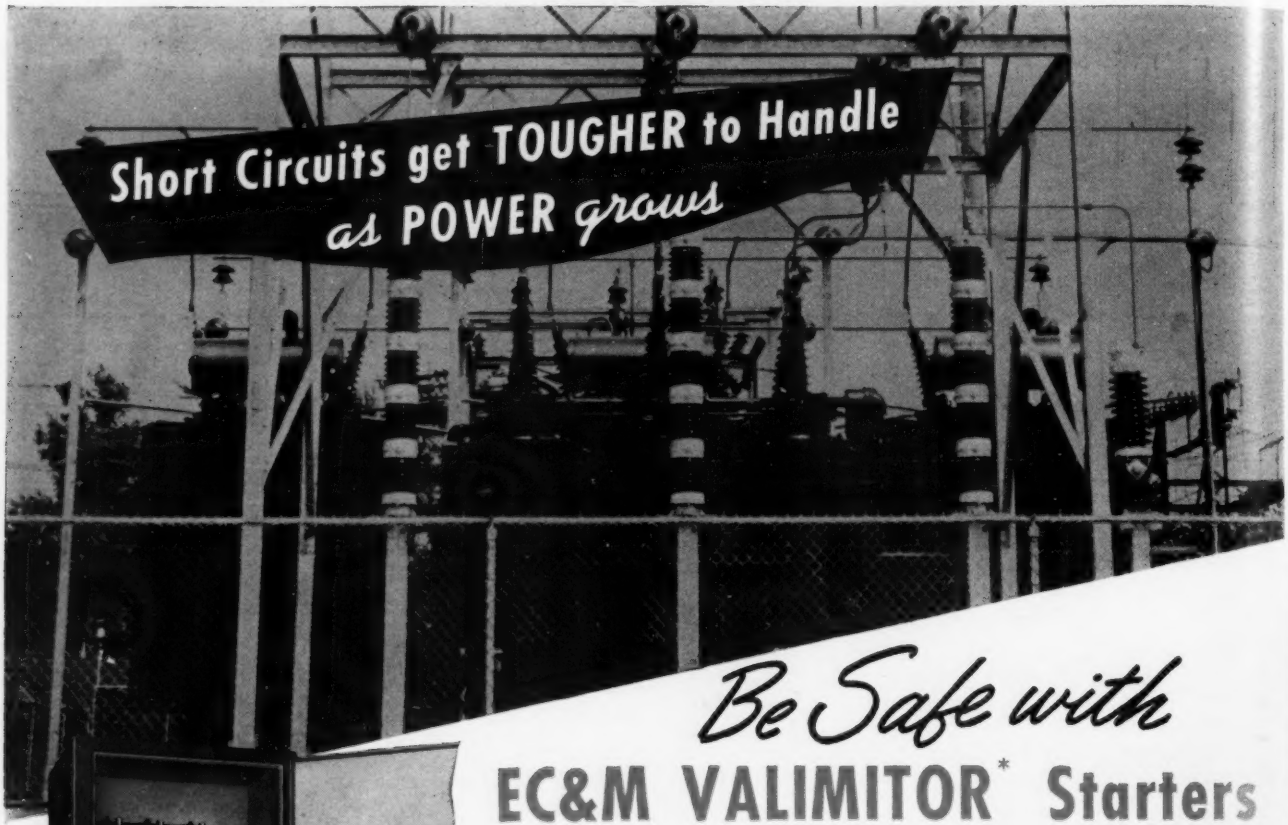

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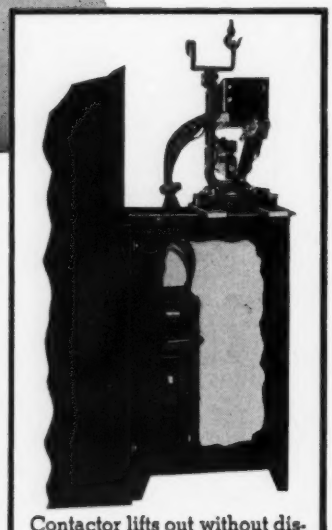

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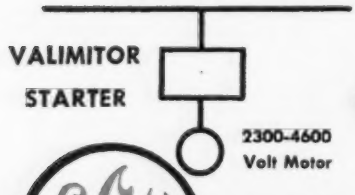

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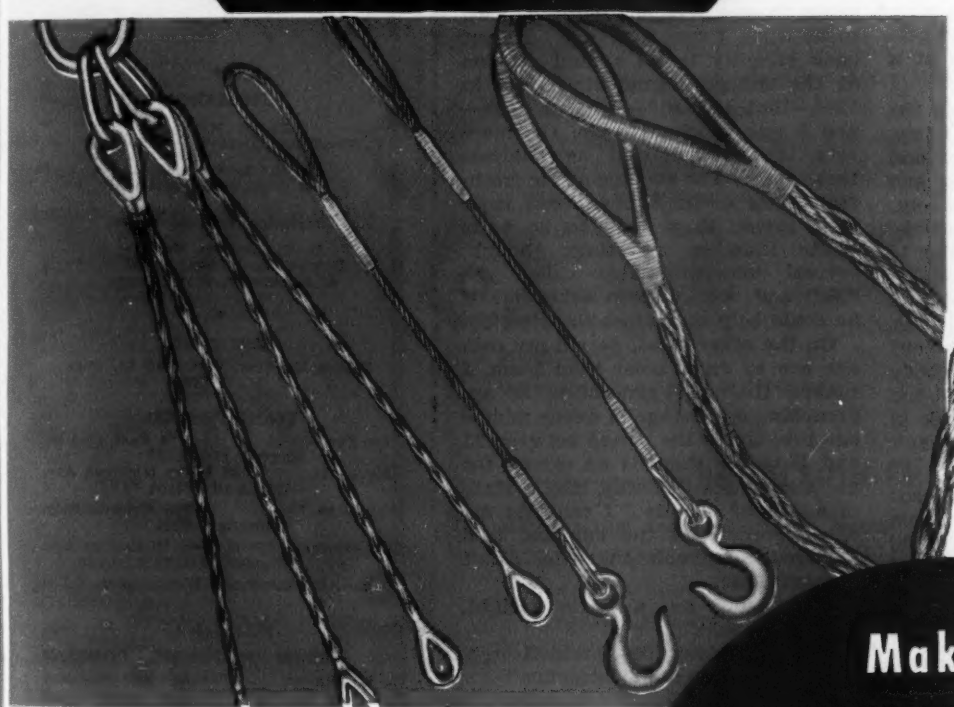

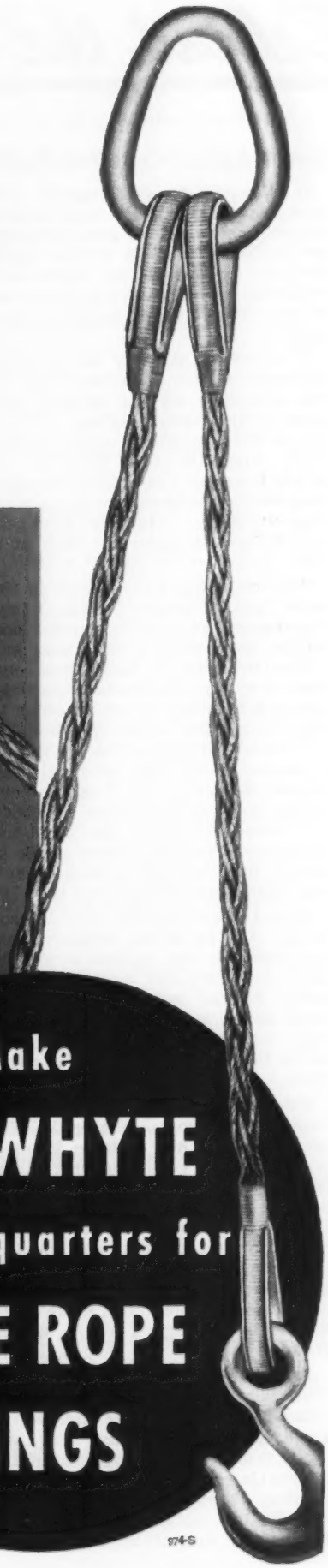

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Behind the Scenes...

Middle Age Is Where You Find It

If you've stopped running for trains and winters seem colder, you're not only getting along quite normally but you'll undoubtedly get the same kick we did out of this explanation of things in general as sent in by one of our "middle age" salesmen over east:

It seems to me they are building staircases steeper than they used to. The steps are higher, or there are more of them, or something. Maybe this is because it's so much farther today from the first floor to the second floor, but I've noticed it is getting harder to make two steps at a time any more. Nowadays it is getting harder to make one step at a time.

Another thing I've noticed is the small print they're using lately. Newspapers are getting farther and farther away when I hold them, and I have to squint to make them out. The other day I had to back halfway out of a telephone booth in order to read the number on the coin box. It is obviously ridiculous to suggest that a person of my age needs glasses, but the only other way I can find out what's going on is to have somebody read aloud to me, and that's not too satisfactory because people speak in such a low voice these days I can't hear them very well.

Everything is farther than it used to be. It's twice the distance from my home to the station now, and they've added a fair sized hill that I never noticed before. The trains leave sooner too. I've given up running for them because they start faster these days when I try to catch them.

You can't depend on timetables any more, and it's no use asking the conductor. I ask him a dozen times a trip if the next station is where I get off, and he always says it isn't. How can you trust a conductor like that? Usually I gather up my bundles and put on my hat and coat and stand in the aisle a couple of stops away, just to make sure I don't go past my destination. Sometimes I make doubly sure by getting off at the station ahead.

A lot of things are different lately. Barbers no longer hold up a mirror behind me when they've finished, so I can see the back of my head, and my wife has been taking care of the tickets lately when we go to the theater. They don't put the same material into clothes any more either. I've noticed that all my suits have a tendency to shrink, especially in certain places, such as around the waist or in the seat of the pants, and the laces they put in shoes nowadays are much harder to reach.

Even the weather is changing. It's getting colder in winter, and the summers are hotter than they used to be. I'd go away, if it weren't so far. Snow is heavier when I try to shovel it, and I have to put on rubbers whenever I go out, because rain today is wetter than the rain we used to get. Drafts are more severe, too. It must be the way they build windows now.

People are changing too. For one thing, they're younger than they used to be when I was their age. I went back recently to an alumni reunion at the college I graduated from in 1943—that is, 1933—I mean 1923—and I was shocked to see the mere tots they've admitted as students these days. The average of the freshman class couldn't have been more than seven, they seem to be more polite than in my time, though; several undergraduates called me "Sir" and one of them asked me if he could help me across the street.

On the other hand, people my own age are so much older than I am, I realize that my generation is approaching middle age (I define middle age roughly as the period between 21 and 110) but there is no excuse for my classmates tottering into a state of advanced senility. I ran into my old roommate at the bar and he'd changed so much that he didn't recognize me.

"You've put on a little weight, George," I said.

"It's this modern food," said George. "It seems to be more fattening."

"How about another Martini?" I said. "Have you noticed how much weaker the Martinis are these days?"

"Everything is different," said George. "Even the food you get, it's more fattening."

"How long since I've seen you, George?" I said. "It must be several years."

"I think the last time was right after election," said George.

"What election was that?"

George thought for a moment. "Coolidge," he said.

I ordered a couple more Martinis. "Have you noticed these Martinis are weaker than they used to be?" I said.

"It isn't like the good old days," said George. "Remember when we'd go down to the speakeasy and order some orange blossoms, and maybe *(If you're still with us, turn to page 140)*

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STEEL

Vol. 125—No. 23 December 5, 1949

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STEEL

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December 5, 1949

A Challenge!

In last Wednesday's election in New Zealand a Labor government which had ruled the country for 14 years was swept out of office. The Nationalist Party, winning 46 of the 80 seats in parliament, will take over. It promises the new government will ease restraints on free enterprise.

The upset in New Zealand will focus renewed attention to the elections in Australia on Dec. 10 and in Great Britain next February or March, when Labor governments face tests at the polls, and to elections in 1950 and 1952 in the United States, when the American people will have an opportunity to endorse or repudiate the socialistic government Mr. Truman advocates.

It would be hazardous to suggest that the result in New Zealand is a forerunner of a world movement against socialism. Nevertheless, according to political history, a swing to the right was to be expected. In the United States the average period of continuous rule by a "liberal" party is about 16 years. According to this average, the turn to the right should have occurred in 1948. Return of the Republican party to control of both houses in 1946 certainly indicated that a further shift to the right would take place in 1948. It did not. Why?

Because millions of persons who were not in favor of Mr. Truman's brand of government failed to vote. Every day new evidence comes to light showing that an alarming percentage of industrialists, professional men, merchants and others who are naturally opposed to socialism are not registered and do not vote.

In view of this deplorable situation, it was heartening to hear Frederick S. Blackall Jr., president of Taft-Peirce Mfg. Co., declare at the annual meeting of the American Society of Mechanical Engineers that top management's failure to take a more active part in politics is the greatest indictment of American democracy.

American industry can meet this challenge. It can start right now to "get out the vote" in 1950 and 1952. A vigorous campaign among members of all manufacturers and trade associations, chambers of commerce, engineering societies and similar organizations could easily increase voting by eligibles at least 15 per cent.

Such an increase would insure sound government in Washington.

* * *

BUYERS ARE OPTIMISTIC: Although the short-term outlook in the metalworking industries is gratifying, there is an undercurrent of uneasiness that is difficult to explain.

On the surface, everything points to a good volume of business running well into the first quarter. Output of steel has recovered rapidly until now operations are above prestrike levels and also higher than at any time since last June. The business survey committee of the National Association of Purchasing Agents reports that buyers are optimistic and that there will be few critical shortages of steel after January. A survey conducted by the American Society of Tool Engineers reveals that industrial equipment makers can expect a brighter new year. About 80 per cent of companies responding to the ASTE questionnaire state they will spend as much or more for equipment in 1950 as they did in 1948.

In contrast to this rosy outlook, steel warehousemen report that buying has not been resumed at the pace expected. On mill shipments, supply will balance demand early in the first

(OVER)

AS THE EDITOR VIEWS THE NEWS

quarter, except for sheets, strip and pipe. The situation on sheets and strip, which are sold out for months, will depend upon how the automobile industry fares.

A few price increases on silicon sheets, wire and galvanized sheets were posted by small producers during the week. No general increase in prices appears imminent. Steelmaking scrap prices continue to ease. —pp. 63, 157

* * *

UNIMPRESSED BY LEWIS: Last week's antics of John L. Lewis failed to evoke the usual anxiety on the part of coal operators, government officials or public. Nobody, except the coal miners themselves, got excited when Mr. Lewis, by his silence on Wednesday, permitted the strike to be resumed Thursday. On Thursday, when he ordered the miners to go back to work Monday and to work the first three days of each week until further notice, the main response was elation of the miners.

This apathy on the part of interests which usually react violently to the actions of Mr. Lewis is due chiefly to two factors. First, most industries that are largely dependent on coal have fairly comfortable supplies. Secondly, operators of captive mines who have broken the deadlocks in several previous strikes, this time left it to the commercial operators to make the first move. The latter have maintained a solid front.

The situation is further complicated by the fact that although the old contract ran out last June, nobody knows yet what Mr. Lewis wants. —p. 65

* * *

RELIABLE YARDSTICKS: In this issue the editors begin a series of articles on economic conditions in the principal industrial nations of Western Europe. Each article includes a resume of business conditions in 1949 and a discussion of future prospects. Italy and Sweden are dealt with in this issue. Belgium, Luxemburg, France, Western Germany and Great Britain will be subjects of future articles.

Italy is handicapped by faulty statistics. Figures for the Mussolini era are not trustworthy and statistics for the war period are almost nonexistent. It is difficult to compare Italy's postwar activities with those of any reasonably recent period.

This absence of reliable yardsticks in Italy is a reminder of the danger that lurks in a totalitarian or too-powerful state where dictators "doctor" economic statistics to suit their own purposes. We in the United States are lucky that we still have access to honest statistical information. —p. 74

* * *

"SUPPLEMENTAL" SUPPLY? E. W. Davis, author of the treatise on iron ore which has been appearing serially in this publication for several weeks, sums up the problem of supply in these words: "Before long a supplemental new ore supply must be provided for the nation if we are to produce steel at the rates now estimated by some economists as necessary to meet our future requirements. There is no shortage of ore in the Western hemisphere—the only question being from which of several sources it can be procured for our use most economically."

We can (1) process taconite, (2) import foreign ore, (3) develop revolutionary methods for rapidly mining Lake Superior ores now scheduled for underground mining or (4) move our steel industry to coastal areas where foreign ores are more readily available.

Perhaps the necessity of a "supplemental supply" cited by Mr. Davis will be satisfied by the joint development of promising Quebec and Labrador iron ore properties by American and Canadian interests. —pp. 66, 122

* * *

HOW TO DEAL WITH U. S.: Cyrus S. Ching is a colorful figure in public life. Associates wonder why he revels in the job of federal labor mediator when he could choose any one of a dozen less arduous tasks. Speaking before Detroit's Economic Club last week, he offered the suggestion that businessmen might get along better with government representatives if "they left their lawyers at home."

This is sound advice for industrial executives in many instances where they confer with federal government agents. Mr. Ching obviously is not disparaging the importance of good legal advice. It should be sought and heeded whenever necessary. He is simply pointing out the fact, which many businessmen have learned by sad experience, that there are times when the frank, unstaged plea of an executive unaccompanied by counsel can be much more potent than the most brilliant legal argument. —p. 65

E. C. Shaner

EDITOR-IN-CHIEF

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News Summary

BUSINESS PROSPECTS—Expect good business for the next six months (p. 63). The steel rate last week climbed to 89.5 per cent of capacity, the highest since June 4. Wall Street spokesmen are optimistic, as are purchasing agents. But some uneasy observers say: "Most everything looks too good." They think we'll have to pay eventually for the coal and steel strikes and the government's deficit spending. One phase of the economy which appears particularly promising is in capital equipment. A survey shows that 80 per cent of the companies queried will spend as much or more for capital equipment in 1950 as they did in 1948.

LABOR—Immediate threat of a new industrial coal shortage is dissipated by John L. Lewis' decision to permit his men to work a three-day week (p. 65). Steelmakers' coal stocks are comfortable. . . . Extension of federal social security benefits by congressional action would help clarify the current pension muddle, says Eastman Kodak's Marion Folsom . . . "Leave your lawyers at home" when you go to Washington, advises Federal Mediator Cyrus Ching.

QUEBEC AND LABRADOR ORE—U. S. companies are anteing in the Canadian iron ore gamble (p. 66). Republic, Armco, National, Wheeling, Youngstown and Hanna are participating with Canadians to develop Quebec and Labrador ore. A new company, Hollinger-Hanna Ltd., will manage the project, which will cost between $150 million and $200 million.

ANOTHER HAND MILL GONE—Granite City Steel Co. last week closed its last hand mill (p. 67). The shutdown marked the end of its 15-year modernization program that cost about $20 million. As of last Jan. 1, there were 96 hand units operating out of a total of 1274 in 1930.

SOCIAL CONSCIENCE—How's your social conscience? Speakers at the mechanical engineers' convention (p. 69) urged professional men to get out of their scientific vacuums and try the economic, social and political atmospheres. Management's failure to mix in politics was hit. Management holds no vested positions, engineers were told; it just has the franchise from the people to help run the economy on a capitalistic basis. That franchise can be withdrawn—it already has been in many places—if things don't work out.

ANTI-DEPRESSION REMEDIES—Government legislative experts are already compounding anti-depression prescriptions which may be bottled and packaged in the next session of Congress (p. 70). The Joint Committee on the Economic Report has formed a subcommittee to study the matter. It's headed by Sen. Paul H. Douglas (Dem., Ill.), a University of Chicago economist, and has among its members Sen. Ralph E. Flanders (Rep., Vt.), a former banker and machine tool executive.

FOREIGN—Conditions in the economies of Italy and Sweden are poles apart—poor in Italy, good in Sweden—but both nations have some similar problems (pp. 74, 75). Both are trying to switch more to light, finished manufacturing. Both must find new export markets . . . With this issue STEEL begins a series of articles which will run for the rest of December and will deal with the economic pasts, presents and futures of the major Western European countries.

HERE AND THERE IN INDUSTRY—Cathodic protection against pitting is given vessels in the Maritime Commission's reserve fleet (p. 68) . . . Natural gas is gaining on coal as a fuel to generate power (p. 68) . . . Makers of parking meters find that their markets for original units are about 80 per cent used up (p. 73) . . . Cadillac produced its millionth car Nov. 25 (p. 77) . . . Murray Corp. of America will enter the moderate-price home appliance field on a national distribution basis early next year (p. 80) . . . Look for word soon on the development of a corrosion-proof coating for the steel backing of stainless-clad sheets and plates.

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Economy Making Up Strike Losses

Ingot rate rises to 89.5, highest since June 4. But some uneasy observers think: We must pay the piper for coal, steel strikes, deficit spending

WHEN we asked a business man what he thought about the economic prospects for the next few months, he said, "Most everything looks too damned good."

He and many others sense a feverish, unnatural pitch to business activity. That and other nebulous misgivings lead them to read between the lines and take careful note of the hedges in economic soothsayers' current optimistic predictions. We'll have to pay for the steel strikes, business analysts hint. We'll have to do something about coal. The government's deficit spending will catch up with us eventually.

But the immediate signs and portents are excellent.

Steel Rate Climbs—The steelmaking rate climbed to 89.5 per cent of capacity for the week ended Dec. 3. That surpasses the prestrike level of 85 and is the highest since June 4, 1949.

In the depths of the strike the rate sagged to 7.5 per cent.

The Federal Reserve Board's industrial production index fell only to 166 for October, despite the steel and coal walkouts. It was 174 in September, 170 in August, 162 in July.

Wall Street spokesmen foresee maintenance of the present period of prosperity in the U. S. for at least the first six months of 1950. The hedge is coal: They base their predictions on the condition that there will be no more long walkouts by the United Mine Workers.

Buyers Optimistic—Buyers are optimistic, says the business survey committee of the National Association of Purchasing Agents. There will be no critical steel shortages after January, purchasers believe. The ground lost by steel strikes in the steel industry itself and in consuming fields will soon be made up. They hedge on the business upturn: "We see no signs that the uptrend of August and September will continue its sweep again once strike effects are dissipated."

West Coast steel consumers have had to curtail operations because of shortages only in rare instances. Metalworking prospects in that area are excellent.

The capital equipment outlook is promising for 1950. A survey by the American Society of Tool Engineers is optimistic, but the survey-takers warn against a rosy-glow interpretation of the results.

Equipment Prospects Good

Tool engineers' survey shows 80 per cent of firms expect 1950 buying to equal or top 1948

A GOOD MANY companies will trim costs by buying more cutting tools, materials handling equipment and machine tool accessories next year than they did in 1948.

A survey conducted by the American Society of Tool Engineers reveals that industrial equipment makers may look toward a brighter new year: 80 per cent of responding companies will spend as much or more for equipment as they did in 1948. Almost half of the companies surveyed (45 per cent) think they'll spend more.

The study was carried on through questionnaires addressed to members of the society.

Larger companies show the biggest increase in planned purchases: At least 79 per cent say their 1950 buying will exceed that of 1948.

Only 7 per cent say they will buy less.

Medium size companies' plans are:

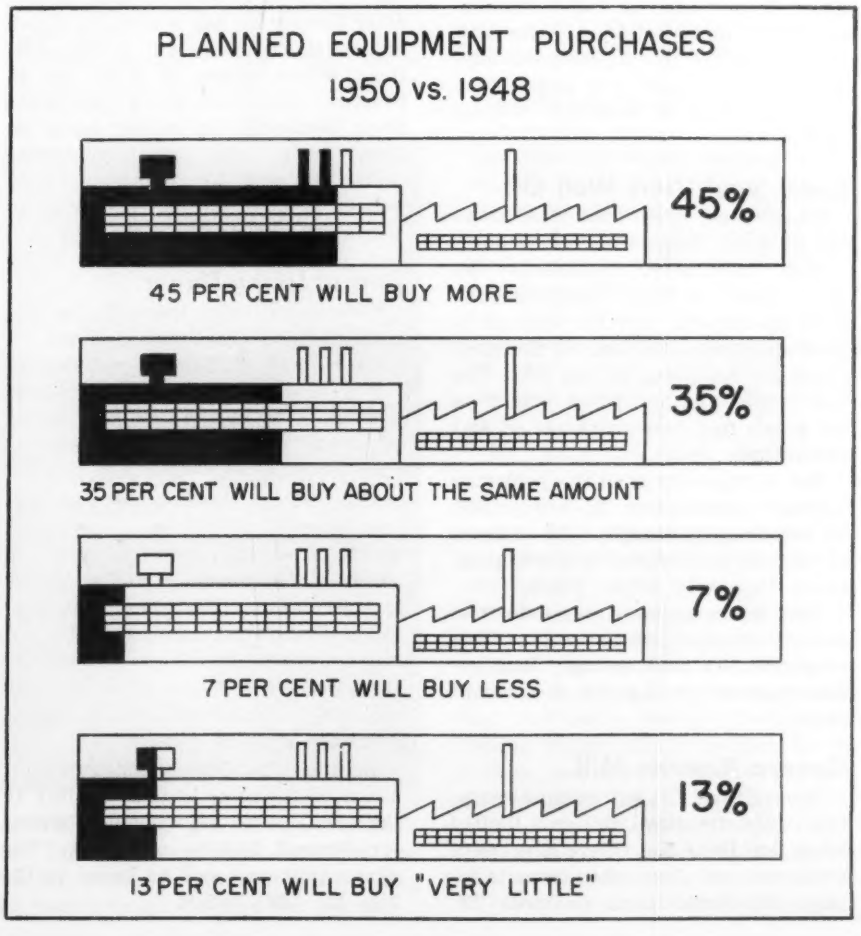
To buy more—55 per cent.

To buy about the same—29 per cent.

To buy less or very little—16 per cent.

Half of the smaller companies will buy about the same in 1950 as they did in 1948. But 28 per cent say they'll buy more; 22 per cent say they'll buy less.

Cost cutting is the chief reason for most of the projected buying. The



companies queried expect to buy either machinery or machine accessories as a means of reducing costs. They intend to replace obsolete equipment for the same reason. Materials handling equipment will be purchased by 27 per cent of the companies as a further means of cutting costs.

Expenditure Breakdown—The analysis by ASTE shows 52 per cent of the companies will spend the largest portion of their budgets for new machines to cut costs. Another 26 per cent will spend most of their budgets for modernizing existing equipment. Replacement of worn out and obsolete equipment will represent the largest outlay for 12 per cent of the companies. Materials handling equipment will take the largest portion of the budget for 10 per cent of the firms.

A warning against over-optimism on the strength of the survey is issued by Harry E. Conrad, ASTE executive secretary. He points out the survey was taken among ASTE membership and therefore in plants which have men "definitely assigned to the job of tool engineering," the specifying and selection of processes and equipment.

An interesting finding brought out by the study is an increase in the average time allowed for new equipment to pay for itself. If the equipment pays for itself in two years or more, 68 per cent of the companies say they will be satisfied. Over half of this number are figuring on buying equipment even if it takes three years or more to earn its original cost.

Coast Steel Users Well Off

West Coast steel and fuel users are in good shape.

Most fabricators weathered the steel strike without disruptions to their operations; now the outlook is good supplywise because all the steel producers are going at full tilt. The coal strike had no direct effect as the area's fuel consumers use oil and natural gas.

The oil industry is in the doldrums because consumption of heavy fuel oil has dropped sharply. Inventories of fuel oil have risen to the highest levels in nearly seven years.

Also depressed is private industrial and commercial construction. This may spurt by next spring. Residential construction is going at a record pace.

Geneva Restarts Mill

Geneva Steel Co. will resume operation of its structural mill on a limited basis on Dec. 5. Operations were suspended last June when demand for large structural items declined. Dr. Walther Mathesius, president of the U. S. Steel Corp. subsidiary, says sufficient orders are in hand to establish a rolling schedule of one turn per day, five days a week.

Kaiser Starts Pipe Mill

New electricweld pipe mill capable of producing pipe from 5 to 14 inches, and the new 86-inch hot strip mill of the Kaiser Steel Corp., Fontana, Calif., will start operations shortly after the turn of the year.

These facilities will add to the flexibility of the Fontana plant and will provide the West Coast with additional steel products.

Oil Well Drilling Near Record

Total drilling operations of nine major U. S. oil companies this year will be near the 1948 level which set a postwar record, reports to a House subcommittee questionnaire show.

Pacific Power Outlook Good

The Pacific Northwest electric power situation is more promising. Business executives hope to go through this winter without brownouts, although severe cold weather will change the picture.

A long-term shortage still seems inevitable. Private utilities of Washington and Oregon will feel the pinch first. Public agencies under the law have first call on federal power, private companies getting what is left after Bonneville has served its direct industrial customers and public utilities. When power is short, as at present, cheap energy is purchased from Bonneville by public agencies, then high cost steam-generated power is sold to private utilities, who must bear the increased cost of steam-generated electricity.

Cost of Living Down

Consumers' Price Index of the Bureau of Labor Statistics dropped 0.6 per cent between Sept. 15 and Oct. 15 to 168.5 per cent of the 1935-1939 average. Its position on the latter date was the same as on July 15, the low point for this year.

This decline checked the rise that had been in effect since July and which moved the Sept. 15 index to 169.6. Chief reason for the decline in the index was a more than seasonal drop in food prices of 1.8 per cent. Clothing and house-furnishings also declined fractionally while fuel, electricity and refrigeration prices increased slightly.

Because the Consumers' Price Index is at the same level as on July 15 there will be no adjustment in wages for General Motors employees. The next adjustment will be based on the Jan. 15, 1950, index.

Permits Reopening of Cases

DUE to recent changes in its membership, the Federal Trade Commission has granted respondents in 30 proceedings an opportunity to reargue their cases. Final arguments had been heard previously by the commission as formerly constituted but no decisions had been made.

Respondents are not required to reargue; they have been advised that "the commission as now constituted is willing to hear reargument if you desire it, or is willing to consider the transcript of the previous argument along with the record in the case and reach a decision without reargument."

Rearguments are to begin Jan. 4, in the fifth floor hearing room in the Federal Trade Commission, Washington, and continue into April.

The 30 cases that may be reargued, and their nature, include those against: Ruberoid Co. Inc., New York, price discrimination in sale of roofing and insulating material; Chain Institute Inc., Chicago, price conspiracy and discrimination; National Lead Co., New York, monopolistic practices in sale of lead pigments; Realflex Products Co., Brooklyn, N. Y., misrepresentation in sale of spark plug cable sets.

Industrial Use of Isotopes Soars

INDUSTRIAL use of radioactive isotopes for continuous inspection has increased 100 per cent in the past year. So says William C. Nussbaum, New York sales manager for Tracerlab Inc., Boston.

Use of isotopes is going beyond the laboratory stage; first applications in regular manufacturing operations are starting in many plants. Isotopes permit economical inspection of products containing metals, rubber, plastics, paper, textiles and gum. This means improved quality control and reduced costs, says Mr. Nussbaum.

Portsmouth Purchase Approved

STOCKHOLDERS of Detroit Steel Corp. have approved purchase of assets of Portsmouth Steel Corp. by issuance of 300,000 shares of stock to Portsmouth next Jan. 3, plus $6 million for inventories and miscellaneous assets. The stock allotment will cover land, buildings and equipment of the Portsmouth, O., producer, and partial payment for capital stock of wholly-owned subsidiaries. Capital stock of Detroit Steel was increased from 1 million to 2 million shares to cover the acquisition.

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Three-Day Week Again

Miners avoid showdown with government, but steelmakers' coal costs will be boosted

THREE-DAY work-week in the soft coal mines, ordered by John L. Lewis Dec. 1, will mean higher costs to steel producers. Operators of captive coal mines may be forced to buy part of their coal requirements from commercial mines while their own facilities are operated on an uneconomical part-time basis.

The three-day week precludes the probability of an early curtailment in steelmaking for lack of coal.

Stocks Are Comfortable—Most steel companies have fair to adequate stocks of coal above ground. Inventories were built up substantially during the past three weeks when the miners worked a 6-day week. Some steel companies added coal purchased from commercial companies to their stockpiles, in anticipation of a new mine strike after Nov. 30.

Steel producers will try to keep coal stockpiles at high levels, due to uncertainty about the next turn of events in miner-operator negotiations.

Avoids Showdown—Mr. Lewis' action in ordering a new three-day week came after the miners had left the pits last Thurday on the expiration of the three-week truce ending Nov. 30. By putting the three-day week in effect again, the mine union leader hopes to curtail coal stocks to improve his bargaining position. At the same time, he probably is avoiding a showdown with the administration. President Truman had indicated he would invoke the Taft-Hartley law should a new coal stoppage cause an emergency.

Under the new order, miners will work on Mondays, Tuesdays and Wednesdays. Only essential maintenance work will be permitted on other days.

Settlement with the operators appears as far away as ever.

Weirton Insurance Liberalized

Increased benefits at lower unit costs are provided Weirton Steel Co. employees under a new contributory insurance program agreed upon by the company and the union. Company will pay 60 per cent of the cost and employees will pay 40 per cent.

Negotiations on proposed modifications to the Weirton retirement annuity program are in progress between the company and the union. The plan, to which both employees and the company contribute, has been in operation since 1941. It provides minimum retirement benefits of $100 a month, including social security.

Amount and cost of life insurance and health and accident insurance will vary in proportion to employee's earnings.

The company and the union present this comparison to show increases in benefits for an employee earning $300 a month:

Life insurance raised to $3500, plus $500 funeral benefits, from $2000 under former plan.

Sickness and accident benefits raised to $35 a week for 26 weeks from $30 a week for 14 weeks.

Hospitalization raised to $7.50 a day for 45 days, plus $75 for incidental expenses, from $5.50 a day, plus $25 for incidentals.

Surgical benefits on $175 scale provided in new plan. Old plan provided none.

New plan will cost employee $5.40 a month, less dividends. Old plan cost $6.15 monthly.

Urges OASI Extension

Early legislation to improve and extend the coverage of the government's contributory old age insurance plan is urged by Marion B. Folsom, Eastman Kodak Co.

Unless steps are taken soon to strengthen the Federal Old Age and Survivors Insurance plan, he believes the country "faces great danger of losing this plan by default and adopting a charity approach entirely."

If Congress should extend the benefits provided under federal social security, industrial companies would be in a better position to consider the advisability of private pension plans to supplement the federal benefits, Mr. Folsom told the 308th meeting of the National Industrial Conference Board in New York.

"Leave Lawyers at Home"

Declaring that he alone was responsible for recommending a fact-finding board and naming its personnel in the recent steel strike, Cyrus S. Ching, chief federal labor mediator, told members of Detroit's Economic Club last week that rumors of a "deal" between President Truman and Philip Murray of the USA-CIO were "just another evidence of misunderstanding of government by business."

He suggested that businessmen might get along better with government if they left their lawyers at home and approached government representatives without chips on their shoulders.

Discussing pension plans, the 73-year old mediation expert warned against placing too much reliance on private industrial pensions, pointing out that while strong industries and strong unions might be able to negotiate and operate satisfactory programs, they might spell ruin for small and financially weak companies. He favored increases in federal social security to the point where it becomes adequate and equitable.

TOUGH GOING: It wasn't easy even on half-tracks to get welders into position on the line of the third spread of the Transcontinental Gas Pipe Line between Bassfield and Collins, Miss. Welders, made by Lincoln Electric Co., Cleveland, had to be given a tow to get them through the mire this summer

Quebec, Labrador Ore

Deposits will be developed jointly by Canadian and American companies

AMERICAN steel companies will participate with Canadian interests in the development of Quebec and Labrador iron ore.

Jules R. Timmins, president of Labrador Mining & Exploration Co. Ltd. and of Hollinger North Shore Exploration Co. Ltd., makes this announcement. His companies have been conducting the exploratory work for the past few years.

New Companies Formed—A new Canadian company, Hollinger-Hanna Ltd., will manage the operation and an American firm, Iron Ore Co. of Canada, in which American steel corporations will participate with Canadian interests, will finance the undertaking.

American participants in the venture are Republic Steel Corp., Armco Steel Corp., National Steel Corp., Wheeling Steel Corp., Youngstown Sheet & Tube Co. and Hanna Coal & Ore Corp. The Canadian companies are Labrador Mining, Hollinger North Shore and Hollinger Consolidated Gold Mines Ltd.

Canadians Retain Reserves — Mr. Timmins says that Iron Ore Co. of Canada has been given the right to lease a large part of the iron ore reserves in the concessions, but that Canadian companies are retaining ample reserves to supply the requirements of the steel business of Canada and to anticipate the exportation of iron ore to England and other European countries in the future.

Mr. Timmins states that a great deal of additional exploratory development and engineering work is yet to be done and that it will be at least another year or two before any start can be made on construction.

Construction Needed — "The plan contemplates," he says, "the construction of 360 miles of railroad from the mines to Seven Islands on the St. Lawrence river terminal and port facilities at Seven Islands, development of mining properties and electrical power facilities and building of communities required for the eventual production and transportation of 10 million tons of ore yearly.

While there are no accurate estimates of the project's cost, from $150 million to $200 million may be needed.

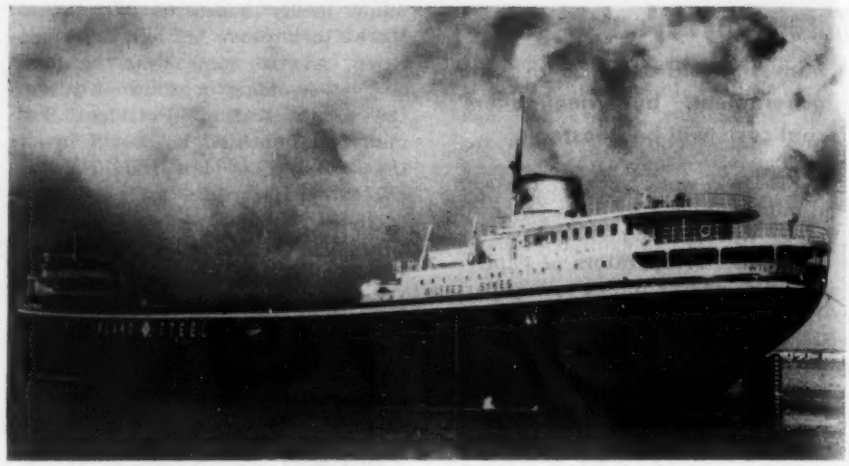
Iron Ore Project Studied

EXPLORATION OF the Klukwan field near Skagway, Alaska, is the most ambitious iron ore project undertaken by the Bureau of Mines in the current fiscal year.

The ore is a low-grade magnetite containing about 20 per cent iron.

If the tonnage is as vast as has been indicated by preliminary observations, it might well be the basis of a substantial future iron and steel industry in Alaska. Because of ample potential water power in the area, the ore would be reduced by electric smelting.

In Minnesota the bureau continues work on taconite. It is seeking the best technique for drilling and blasting to get the proper amount of fragmentation without secondary blasting. In Alabama bureau engineers are reviewing all information about Alabama iron ores to set up an estimate of reserves in that area.



GREAT SHIP ON GREAT LAKES: Ore freighter *Wilfred Sykes* successfully passed her trial run on Lake Erie. Built for Inland Steel Co. by American Ship Building Co. at Lorain, O., the 678-foot ship has a capacity of 20,000 tons. It can make 16 miles an hour when loaded. Photo by Carl McDow

High Grade Brazilian Ore

STEEL plants in the United States will take most of the 500,000 tons of high grade (69 per cent) compact hematite which Vale do Rio Doce Co., Rio de Janeiro, Brazil, expects to deliver in 1950. A small percentage of the ore will be used in blast furnaces, mixed with low grade local ore, but most of it will go into open hearths as charge ore.

Experiments conducted by the South American company show that feeding four tons of its ore into a 160-ton heat at about the seventh hour saves about one hour per heat. The saving in one steel plant in fuel, labor and other overhead factors amounted to $250 per heat.

Armco Purifies Coke Oven Waste

A METHOD to get rid of phenol, a poisonous waste from coke ovens, is announced by Armco Steel Corp.

Phenol is carbolic acid; the new treatment changes it into plain water and carbon dioxide. The process is to treat the waste with chlorine, which is essentially the same as that used in purifying drinking water.

In developing the method, Armco worked with the Ohio River Sanitation Commission, the Ohio State Health Department and Wallace & Tiernan, Bellville, N. J.

The process is still in the laboratory stage. The next step will be to build a pilot plant for large-scale purification experiment.

Brush Offers Ultrasonic Product

BRUSH Development Co., Cleveland, is manufacturing ultrasonic equipment.

Research and development reveals that the use of ultrasonic energy can complete the emulsification of nonmiscible liquids like oil and water, rearrange the molecular structure within many substances and accelerate electrolytic agents as in plating operations.

Brush is offering three models of varying capacity in ultrasonic equipment.

The smallest is for laboratory-scale research. The second is for pilot-plant and some production operations. The third type is a full-scale production unit custom built to requirements of the industrial user.

Brush is organizing a Hypersonic Division to handle its new product.

Fairless To Speak in Chicago

BENJAMIN F. Fairless, president of U. S. Steel Corp., will be principal guest and speaker at the 56th annual dinner meeting of the Illinois Manufacturers' Association, at the Stevens Hotel in Chicago, Dec. 13.

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Chemical-Metal Marriage

Successful co-operation between chemistry, metalworking industries seen at chemical show

THE SUCCESSFUL marriage of the metalworking and chemical industries was demonstrated at the Chemical Exposition in New York, Nov. 28-Dec. 3.

American and foreign chemists, engineers and production executives saw many examples of chemical-metalworking co-operation in the more than 400 exhibits occupying four floors of the Grand Central Palace.

Mirrors Coated with Gallium—Mirrors coated with the rare metallic element gallium were featured at Aluminum Co. of America's display of aluminum products and chemicals. About one tenth of one per cent of gallium is recoverable from bauxite. This little-known mineral in its pure form melts below the temperature of the human body, but boils at the temperature of molten steel.

Among the mechanical innovations was a beta ray thickness gage, which affords a continuous indication of the thickness of sheets of metals, paper or plastics without contact. This was shown by General Electric Co., Schenectady.

Charles Engelhard Inc., East Newark, N. J., exhibited a controlled atmosphere indicator for metal treating industries. The device is also useful as an explosion indicator and for maintaining combustion efficiency in ceramic kilns and coke ovens.

A newly developed nitroseal generator, producing pure nitrogen with a controllable hydrogen content of 0.1 to 40 per cent without explosive hazard was featured in the Baker & Co., Newark, N. J., exhibit. The generator is said to reduce nitrogen gas costs as much as 90 per cent.

Lebanon Shows Centrifugal Casting—A recent development in the centrifugal casting of steel in metal molds was shown by Lebanon Steel Foundry, Lebanon, Pa.

Titanium Alloy Mfg. Division, National Lead Co., New York, exhibited titanium boron steel, titanium metal sponge, sheet, rods, etc., also high dielectric compounds and condensers for electronic applications and very high temperature stabilized zirconia refractories.

Tanta-clad, nickel or other structural base metal surfaced with tantalum to provide chemical immunities in processing equipment, was shown by Fansteel Metallurgical Corp., Chicago.

Iron Powder as a Gasoline Catalyst—The exhibit of General Analine & Film Corp., New York, included carbonyl iron powder with a particle size equivalent to fine talcum powder and containing no metallic impurities. The material proved effective experimentally as a catalyst in the Fischer-Tropsch reaction used in the manufacture of synthetic gasoline. Featuring cadmium and nickel accumulator elements in an alkaline solution, a new type of long life battery, produced by Baker & Co., Newark, N. J., was exhibited. According to Baker's research and development department the new battery will last for 20 to 25 years. This type of battery has long been used in Europe, but the Baker Co. is said to be the first American firm to undertake its manufacture.

Railroads Deny Overcharge

INSOLVENCY for many railroads and impairment of service by all will result if the government is awarded its claim for alleged wartime freight overcharges. That warning was issued by Fred G. Gurley, president, Santa Fe Railway, in his testimony before the Interstate Commerce Commission in the reparations case brought against the railroads by the Justice Department.

He said the working capital of all the railroads amounts to only one-quarter of the estimated $2 billion plus interest involved in the complaints. He placed the Santa Fe's share at over $100 million and added, "While the Santa Fe is perhaps in a relatively fortunate financial position as railroads go, I can assure you we haven't any such surplus money as that."

Declaring the government claims were unfounded, Mr. Gurley emphasized that military traffic moved at lower rates than commercial traffic and services performed for the government were better than those for commercial shippers in peacetime. In this assertion he was backed by Charles H. Buford, president of the Chicago, Milwaukee, St. Paul & Pacific Railroad, who pointed out that railroads earned a rate of return of only 4.6 per cent on their net investment for the 1941-1946 period.

Mr. Buford estimates that effects of the war will cost the railroads $2 billion for delayed maintenance and replacement of property. He told the ICC replacement of locomotives and cars that should have been retired during the war will cost from $400 million to $500 million more than when they wore out. Overloading, makeshift and delayed maintenance plus greater distances traveled per year took additional life out of equipment which at present costs will come to about $1 billion.

Completes Modernization

Granite City spends $20 million in 15 years; abandons last old style pack sheet mill

MARKING completion of a 15-year, $20 million expansion and modernization program, Granite City Steel Co. last Wednesday ceased operation of the last old style pack sheet mill in the St. Louis area.

While John N. Marshall, board chairman, outlined the company's history for guests attending the ceremonies, N. P. Veeder, vice president-operations, threw the switch stopping the hand mill.

When developments in the early '30s indicated the tremendous advantages of continuous mills over the old style hand mills, Granite City embarked on the modernization program to provide the desired quality of product and the attendant production economies, said J. D. Streett, vice president in charge of development.

Raises Man-Hour Output—The old hand mill produced 700 pounds per man-hour, compared with 15,000 pounds per man-hour on the company's new continuous hot mill.

The trend is illustrated by these figures: As of Jan. 1, only 96 of the old hand mills were in operation throughout the country, compared with 1274 operating in 1930.

New Facilities—Granite City in its modernization program has installed a 90-inch continuous hot strip mill, a 56-inch continuous four-stand tandem cold reduction unit, continuous pickling line, 13 gas heated radiant tube annealing furnaces, skin pass units for temper shearing and slitting equipment and classifying equipment for tin plate.

During World War II the government built a modern open hearth plant containing three 180-ton furnaces, supplementing the company's ten 65-ton units. Granite City is leasing the government facilities on a five-year basis with option for subsequent purchase.

Centrifugal Pipe Co. Dissolves

STOCKHOLDERS of Centrifugal Pipe Corp., New York, voted for dissolution of the corporation.

The company had held agreements to license makers of cast iron pipe under the De LaVaud process. A number of those agreements expired in 1939 and in 1943. Other agreements since have terminated. All major licenses to make pipe under the De LaVaud process have expired by limitation of the life of patents.

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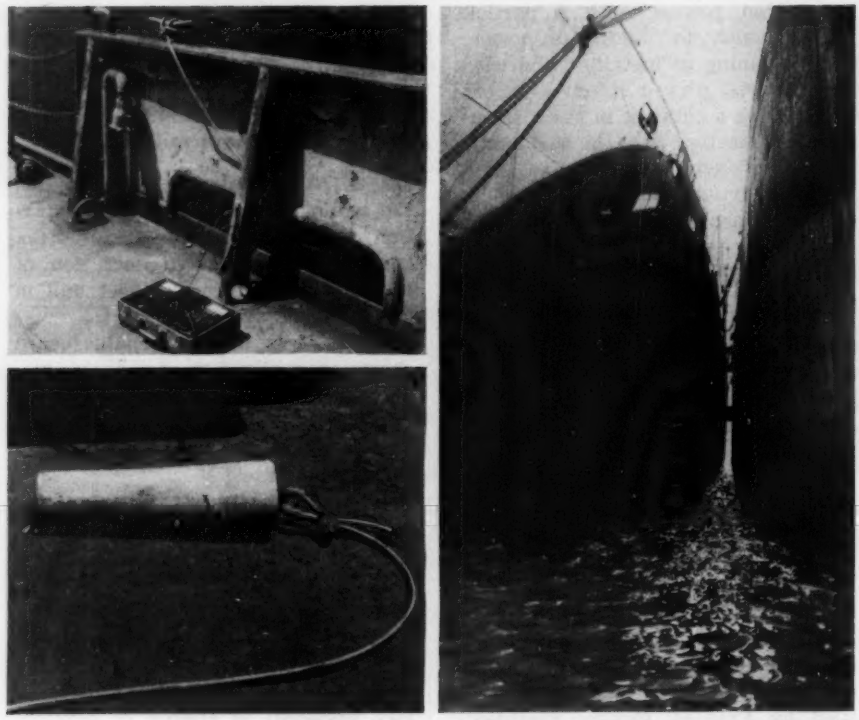


Milliammeter (above, left) measures current flowing through anode (below, left) which is bonded to ship bottom. Anodes are suspended over the side (right)

Rust Protection by Magnesium Anodes Boosted

CATHODIC protection is given this vessel at Wilmington, N. C., by attaching an electrically charged cable to a magnesium anode and suspending it over the side of the ship.

The Maritime Commission will apply the technique to the 2200 cargo ships in the National Defense Reserve Fleet. Earlier this year Dow Chemical Co. demonstrated cathodic protection is a cheaper method of preventing pitting of steel bottoms in salt water. Now the Navy Department is thinking of applying the technique to its mothball fleet.

Estimating that it would cost about twice as much to protect the ships by sandblasting and painting, the Maritime Commission will ask Congress for the necessary funds to equip all its idle ships before June 30, 1951. Cost of protecting 2200 vessels for 20 years by the cathode technique in government dry docks is $26.4 million; by sandblasting and painting, $50 million.

This is the cathode technique: Magnesium anodes are electrically bonded to each hull. The salt water acts as the electrolyte. In the primary cell thus formed the magnesium bar is the positive pole. The hull becomes the cathode or negative pole. Current flow generated by the cell is controlled. It follows a fixed path to the vessel, raising its hull voltage and causing polarization of the hull plates. This neutralizes or overcomes the localized surface action between anodic and cathodic areas of hull plates that normally causes surface wastage and severe localized pitting.

Here are the requirements: Magnesium anodes, cables for bonding them to the ship bottom, wire rope for suspension of the anodes and a small number of milliammeters and millivoltmeters for determining proper current and voltage.

Cathodic protection will be applied to ship bottoms only. To protect the alternately wet and dry steel at the wind and water line, the ships will be careened so a 4-foot band can be sandblasted and coated with protective paint. Expense of the operation is included in the estimate that it will cost about $600 to protect a bottom by cathode treatment for a year or $1,320,000 for the entire fleet of 2200 ships per year.

Anchor chains cannot be protected in the same way, though. The chain links make an electrical circuit of higher resistance than can be overcome by the flow in a magnesium-anchor chain circuit depending on its own current.

Tired of Tending Furnace?

IF YOU'RE tired of going to the basement many times a day to attend to your coal-fired furnace, take heart. New devices developed for a hand-fired smokeless furnace for the home result in a unit that does not need attention more than once in 24 hours.

The furnace, called the Illinois Smokeless, was developed by the University of Illinois, Lennox Furnace Co., Marshalltown, Iowa, and others. Its details were revealed at the annual meeting of the American Society of Mechanical Engineers in New York.

The new developments are a two-stage barometric draft regulator and a simple, semiautomatic hold-fire damper, installed on a smokeless furnace.

Gas Versus Coal

Lion's share of steam-generated power was coal-produced, but use of gas is gaining

WHEN you flip a light switch, chances are about even that the electric energy was derived from coal. Last year 54 per cent of all electric power production was generated by burning coal. But there's one contender for coal's position as a power generator; it's gas.

Steam-generated electric power output was about 200 billion kwhr last year; an additional 81.7 billion kwhr were generated by water power. The lion's share, 152.3 billion kwhr, was coal-produced, 31 billion from gas and 17 billion from oil. In the last 25 years—when steam-generated electric power increased 512 per cent—use of coal and oil has only tripled. Gas consumption is 16 times greater. Last year 99 million tons of coal, 42 million barrels of fuel oil and 476 billion cubic feet of gas were used by power utilities.

Influence of Geography — Geographic location has much influence on the fuel used by power companies. In the oil country, gas is used almost exclusively. Near coal fields, this fuel dominates. But coal-using utilities are equipping established and new facilities to use gas where formerly only coal was the fuel. This is in line with the trend away from coal in domestic heating (see STEEL, Nov. 21, p. 64).

Many utilities use gas in off-peak consumption periods, in the summer and on weekends. Gas so sold would otherwise be "dump" gas, not required for other purposes but available because of pipeline capacities. As more gas line capacity is built, the period when dump gas is available will widen, narrowing coal needs.

Alternate Fuels — Power plants under construction or recently completed in the Midwest are almost universally equipped with gas burners. These are interchangeable with powdered coal burners. Because no boiler changes are necessary, gas equipment has been installed in many existing facilities.

Engineers Must Sharpen Social Consciences

Speakers at mechanical engineers' meeting urge professional men to leave scientific vacuums to try economic, social and political atmospheres

THE ENGINEER must leave his scientific vacuum and try the economic, social and political atmospheres.

This was urged by several speakers at the American Society of Mechanical Engineers' annual meeting in New York, Nov. 27-Dec. 2. Oldtimers among the 6000 at the affair may have had trouble reconciling themselves to the "tainting" of a scientific profession with social ideas.

Such subjects as management in politics, management's responsibilities to the community and employees and human engineering were typical in a program whose theme was "the engineers' contribution to a peaceful world."

Management Failure Hit—Management's failure to mix in politics was hit by Frederick S. Blackall Jr. as the "greatest indictment of American democracy." He says that greater political action by management is "good insurance for tomorrow's industrial climate." Mr. Blackall is president and treasurer of Taft-Peirce Mfg. Co., Woonsocket, R. I., and second vice president of the National Machine Tool Builders Association.

"Management holds no vested position," says Wilfred Wottrich, Manufacturers Trust Co., New York. Management just holds a franchise granted by the people to help run the economy on the capitalistic system. If things get rough, the people will withdraw the franchise to try something and somebody else—as they already have in nearly every country of the world but the United States.

He said economic and social trends are placing management in the new position of trustee to the stockholder, labor, consumer, community and the public.

Human Engineering — Lillian M. Gilbreth, widow of Maj. Frank B. Gilbreth and an engineer herself, called upon engineers to work with sociologists, psychologists and psychiatrists to "utilize men and nature for the good of mankind." She added that "understanding of people is part of every job."

Harry Read, director of the CIO committee on health, safety and welfare, demanded that management admit labor into a "true" partnership in a kind of consultative capacity.

On the straight engineering level, the society's 22 professional divisions and committees provided an agenda of about 200 technical papers presented by speakers from universities, laboratories and industry.

New Officers—James D. Cunningham, president of Republic Flow Meters Co., Chicago, is the 1950 president of ASME.

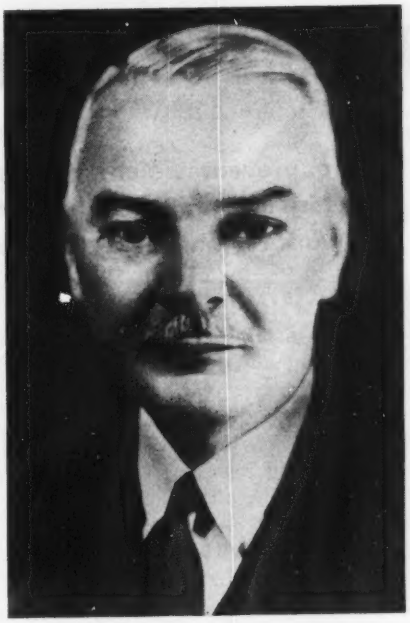
Mr. Cunningham succeeds James M. Todd, consulting engineer of New Orleans. Regional vice presidents are: Frank M. Gunby of Charles T. Main Inc., Boston; John C. Read of Bucknell University; Albert C. Pasini of Detroit Edison Co., Detroit; Samuel H. Graf of Oregon State College. Directors-at-large are: Benjamin P. Graves of Brown & Sharpe Mfg. Co., Providence, R. I., and Thomas E. Purcell of Duquesne Light Co., Pittsburgh.

Medals Awarded — The ASME Medal was awarded to Fred L. Dornbrook of Wisconsin Electric Power Co., Milwaukee. The Worcester Reed Warner Medal was presented to Fred B. Seely of University of Illinois.

Harold B. Maynard of the Methods Engineering Council, Pittsburgh, received the Melville Price Medal. The 1949 Gantt award went to Arthur Clinton Spurr of Monongahela Power Co., Fairmont, W. Va.

The Richards Memorial Award was presented to Arthur M. Wahl of Westinghouse Research Laboratories, East Pittsburgh, Pa. Phillip S. Myers of University of Wisconsin was presented with the Pi Tau Sigma Gold Medal. The Alfred Noble prize went to John C. Fisher of General Electric Research Laboratory, Schenectady, N. Y.

Honorary memberships in the society were conferred on: Oliver Vaughan Snell Bulleid of Coras Iompair Eireann, Inchicore Works, Dublin, Eire; Roy Cummings Muir of General Electric Co., Schenectady, N. Y., Samuel William Dudley of Yale University; Alex D. Bailey of Commonwealth Edison Co., Chicago, and past president of ASME; Robert Yarnall of Yarnall-Waring Co., Philadelphia, and past president of ASME.



JAMES D. CUNNINGHAM
. . . ASME's 1950 president

More Engineering Jobs

JOBS in engineering, the nation's third largest profession, may increase by 100,000 over the next decade. But engineering school enrollment is so high that many graduates may be unable to find jobs in engineering.

This is the outlook for the junior engineer as presented to the ASME convention in New York by Robert R. Behlow, Bureau of Labor Statistics, on the basis of a bureau survey.

After the next few years, engineering school enrollments are expected to decline and opportunities for new graduates will improve.

Stress Analysts Meet

ECONOMIC considerations are of primary importance in the highly scientific stress analysis studies. That was pointed out at last week's 3-day annual meeting of the Society for Experimental Stress Analysis at the Hotel New Yorker, New York.

Design improvements and a better utilization of materials are two of the many benefits accruing by virtue of carefully conducted stress analyses. A saving of about $1 per pound, for instance, is the reward for better aircraft design.

Officers of the society are: President, R. E. Peterson, Westinghouse Electric Corp.; vice president, E. L. Shaw, General Development Corp.; vice president, R. Weller, U. S. Naval Air Missile Test Center; secretary-treasurer, W. M. Murray, Massachusetts Institute of Technology.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

To prevent violent ups and downs in the business cycle, Joint Committee on the Economic Report is laying groundwork for anti-depression legislation

LOOK for further anti-depression legislation next year.

The groundwork is being laid in the current investigation by the subcommittee on Monetary, Credit and Fiscal Policies, Joint Committee on the Economic Report. The group is seeking a formula that can be used to prevent violent ups and downs in the business curve. The formula would be applied by government-manipulation money, credit and fiscal policies.

Primary concern is to find a way of avoiding another disastrous depression like that of the 30s. The subcommittee is unusually competent: Its chairman is Dr. Paul H. Douglas, University of Chicago economics professor who was elected to the Senate last year; among its members is Sen. Ralph E. Flanders, former banker and machine tool executive.

Sounding Board for Economic Ideas—Although the Joint Committee on the Economic Report has no power to initiate legislation, it serves an important role. It is a sounding board for current economic ideas. Sen. Joseph C. O'Mahoney, its chairman, thinks its recommendations will have a profound influence on the country's future policies in relationship to business. He points out that the findings of the old Temporary National Economic Committee (of which he also was chairman) have had a potent effect in shaping up much of the economic legislation of recent years. He expects an equally effective result from the present studies.

Here are the principal proposals the Douglas group has received from one or more key government officials:

Enactment of the Hoover commission scheme to put all money policy-fixing responsibilities, now scattered among a dozen agencies, in one spot.

Authorizing member banks to draw on the Federal Reserve System cash to allay money panics.

Giving Federal Reserve banks authority to buy government obligations in unlimited volume from the Treasury in times of money stringency.

Authorizing continued bond support to regulate consumer credit.

Giving the Federal Reserve system permanent power to regulate consumer credit.

Increasing deposit-insurance coverage from the present $5000 to perhaps $10,000 or $15,000.

Giving the Federal Reserve Board more latitude to control banks' reserve requirements.

Authorizing Federal Reserve banks to make long-term business and industrial loans alongside Reconstruction Finance Corp.

In its search for an automatic formula to control fundamental government tax-spending policies—when the budget should be balanced, when a surplus should be shown, when a deficit—the subcommittee made little progress with the government officials. Treasury Secretary Snyder expresses the prevailing attitude. He says the policy makers should be left free to determine policy on the basis of conditions prevailing at the moment.

Private Sources Give Help—From private sources the subcommittee obtained some help, notably from the Committee for Economic Development. CED called for:

Debt management, interest and monetary policies that will maintain a sound financial structure at all times, thus "avoiding another great depression" by "avoiding another financial collapse."

The setting of tax rates to balance the budget and provide a surplus for debt retirement at an agreed level of employment and national income; altering of the tax rates and the character of public spending only in case of extreme depression or inflation.

Regulation of bank reserves, credit and debt management to encourage inflation or deflation as called for by particular needs.

As a Starter—CED advocated reform in the present "badly constructed" tax system to evolve a system that will provide more incentive for industrial expansion. CED also wants a specially created commission—on which competent nongovernment men would serve—to make a comprehensive study of the present structure and policies of monetary, budgetary and related institutions and develop a co-ordinated tax-spending setup.

The Douglas group is to make its report by Dec. 31. After that it will be acted upon by the full committee.

Hoover Reforms Adopted

TO WHAT EXTENT have government reforms advocated by the Hoover commission been carried out? About 20 per cent, says the Chamber of Commerce of the United States which completed a survey.

Defense Department reorganization, with a civilian assistant secretary in charge of all budgets, is expected to result in savings of as much as $1 billion a year. Creation of the General Services Administration to co-ordinate and supervise procurement and to perform other related functions is expected to result in annual savings of $250 million.

Thus two of the 18 Hoover reports have been largely approved. Major Hoover commission recommendations still to be adopted call for improvments in personnel management and budgeting and accounting practices and for reorganization of the Post Office Department. Some recommendations in the other 16 reports, which will lead to substantial savings, have been adopted by the administration.

Sen. John L. McClellan (Dem., Ark.), Hoover commission member and chairman of the Senate Expenditures Committee, estimates 70 to 80 per cent of the suggested reforms will be adopted over the next two to three years.

Becomes Munitions Board Head

SWEARING IN of Hubert E. Howard as chairman of the Munitions Board closes one of three important gaps in the top defense setup.

Still vacant because of the Senate's rejection of Mon C. Walgren is the chairmanship of the National Security Resources Board. And no successor has been named to replace David E. Lilienthal as chairman of the Atomic Energy Commission when he departs Dec. 31.

Mr. Howard's appointment, on an interim basis, requires Senate approval to be permanent. The 60-year-old Chicago coal company executive has been head of the Defense Department's personnel policy unit. His resignation as chairman of the Binkley Coal Co. to become head of the Munitions Board recalls the time earlier this year when Carl Ilgen-

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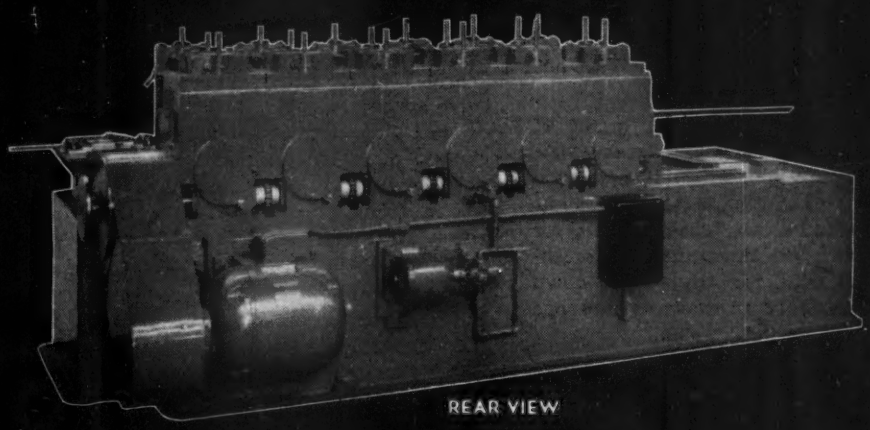
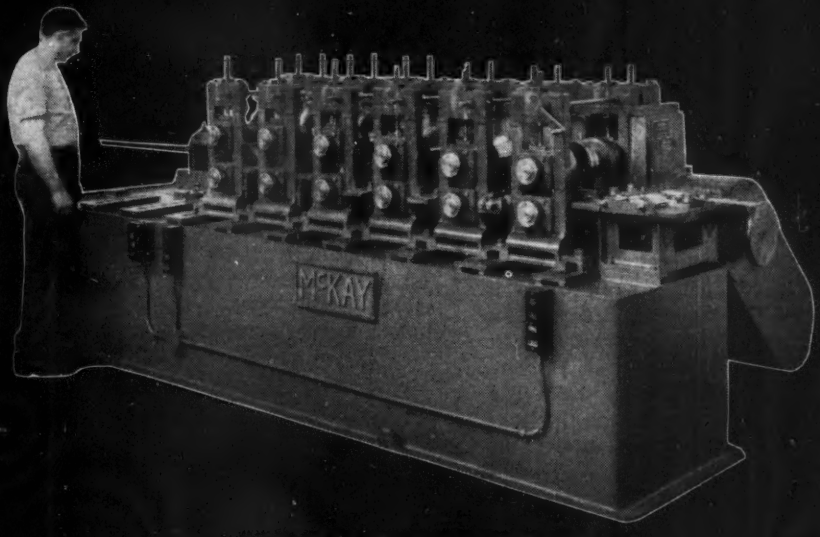
McKAY

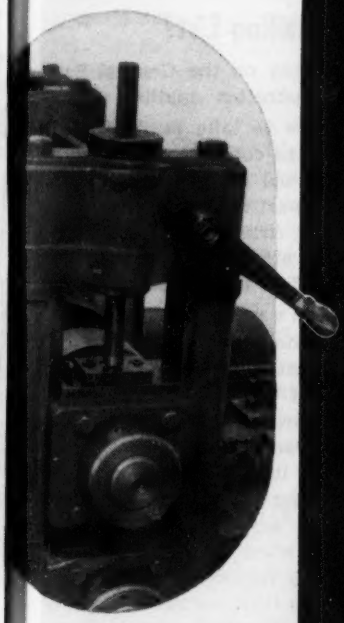
ROLL FORMING MACHINES FOR PRODUCING SHAPES FROM FLAT STRIP.

There's a McKAY Machine to Make Every Section



REAR VIEW





McKAY MICROMETER (patented)

STANDARD FEATURES

MICROMETER ADJUSTMENT. All pressure points on top shaft controlled by simple crank motion, through worm and gear reduction. Top shaft is ALWAYS PARALLEL. Micrometer dial furnishes visible check on roll pressures.

TYPICAL RUGGED McKAY CONSTRUCTION. Standardized units, choice of gearing, anti-friction bearings throughout, all gears between bearings, NOT OVERHUNG.

INTERCHANGEABLE GUIDING EQUIPMENT. easily adjusted, quickly removable.

MINIMUM CHANGEOVER TIME. All units engineered to allow complete roll change in shortest possible time.

LOW MAINTENANCE COST. All of the foregoing features, plus precision workmanship and up to the minute engineering, are a guarantee of low maintenance.

OPTIONAL FEATURES

BASE EXTENSION. Permits increasing the number of roll passes to meet future requirements, by the addition of standard housing units at a later date.

MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base.

ENGINEERS AND MANUFACTURERS OF TUBE MILLS USING

ELECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
ATOMIC HYDROGEN WELD

The McKAY MACHINE Company

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

McKAY

PERFORMANCE RUGGEDNESS PRECISION AND SAFETY.

fritz was turned down by the Senate because he refused to relinquish his salary as a U. S. Steel Corp. vice president (STEEL, Sept. 26, p.42).

Scrap Men Lose First Round

HAVING LOST the first round in its battle for lower freight rates, the scrap industry is arranging to push its request before top railroad officials.

Its spokesman, the Institute of Scrap Iron and Steel, Washington, will appear before the Southern Traffic Executives Committee in Atlanta on Dec. 6, and before the traffic executives of the eastern, southwestern and western territories at times not yet fixed.

The institute is seeking a cut of 18 to 19 per cent generally in existing scrap freight rates. It had been dealing with the General Freight Traffic committees. These groups, for the eastern, southwestern and southern territories, recently turned down the request; the western group has not yet made its decision.

No Strikes in 12 Years

TWELVE-YEAR no-strike relationship between the Lockheed Aircraft Corp. and the local union of the International Association of Machinists was not maintained without some bitter controversies.

It called for delicate and resourceful handling on both sides. Altogether some 30,000 grievances were settled without work stoppages in a period featured by strikes at four other large airframe companies in southern California. The record is described in detail in an 86-page report by Clark Kerr and George Halverson, University of California, Berkeley, Calif. The report pays special attention to handling of controversies over union attempts to invade the rights of management. It brings out the fact that the company-union relationships were at their best when the company had a good order book and that they deteriorated when business prospects worsened.

You can get copies of the booklet—Report No. 6 of the series entitled "Causes of Industrial Peace Under Collective Bargaining"— for $1 from the National Planning Association, 800 21st St. N. W., Washington 6.

Study Military Pricing Policies

MILITARY pricing policies are under intensive study by the Joint Committee of the Armed Services on Military-Contractor Relationship. To be studied are: Pricing and repricing of individual contracts, price ceilings for government procurement, company pricing, incentive-type contracts, cost-type contracts, miscellaneous pricing problems, and profit recovery measures including renegotiation, fixed-percentage limitations, and profits taxation.

Immediate goal is an appraisal of the effects of renegotiation on military procurement and a recommendation for renegotiation policies under the provisions of the Military Appropriation Act for fiscal 1950. The aim is to outline a policy which will emphasize cost reduction rather than reduction of profits alone. Another purpose of the committee is to effect better control of subcontract prices than in World War II. Other subjects to receive special attention are the effects of cost-plus contracts and escalator clauses on wage and material costs and the function of pricing as a factor in placing contracts with small firms. The efficiency of different types of contracts will be studied.

The committee is working with an Industry Advisory Committee on Military-Contractor Relationship. H. G. Batcheller, Allegheny Ludlum Steel Corp., is chairman; Frederick C. Crawford, Thompson Products Inc., is vice chairman.

Air Force Using German Machines

DEVELOPMENT of metals and other materials under high pressure for use by the Air Force will be expedited by captured heavy German machinery.

Work will be done at the Air Force's Manufacturing Methods Pilot Plant, Adrian, Mich., and at certain private plants. The equipment includes nine vertical hydraulic presses, three extrusion presses, two forging hammers and two trim presses for the hammers. Most of these units were used by the Germans to manufacture aircraft parts—wing spars, wing spar caps, structural components, skins and precision-forged propeller blades. When completed, the Adrian plant will work on the development of ideas involving heavy and light metals, plastics, ceramics, and laminated materials.

How About Lobbying?

WHEN the House Committee to Investigate Lobbying Activities starts its open hearings—probably early next January—the testimony will make headlines. There are two prime objectives. The big one is to uncover lobbying activities of federal officeholders in violation of the law. The other is to determine the extent to which private lobbyists are not registered.

The registered lobbyists will not be bothered: Rep. Frank Buchanan (Dem., Pa.), chairman of the committee, has made it clear that in his opinion lobbying serves a useful purpose and is almost indispensable to the business of government. By the lobbying process, legislators get the views of the interested and informed parties and are able to vote on new measures with more understanding.

One question asked about private lobbyists is why only 125 out of 400 trade associations in the country have registered. Are the others doing anything to influence legislation?

Lobbying is a multimillion dollar industry; as of June 30, registered lobbyists numbered 2347. This included 1873 individuals and 474 organizations. It is interesting to note that while more than 2000 registrations represent the management side of business, the registered labor lobbyists number only 120.

On GSA Mailing List?

WANT to stay on the General Services Administration mailing list?

You'll have to take positive action if you want to continue to receive invitations to bid on items you manufacture. As part of its effort to prune uninterested firms from its mailing list, GSA is attaching a "No Bid Response Card" to its invitations to bid.

If you don't want to bid on a particular schedule but wish to receive future invitations to bid, you must indicate that desire on the "No Bid Response Card" and return it to GSA. Otherwise you will be removed from the mailing lists. If you are not on GSA's mailing list, advise GSA of the products or services on which you wish to bid when they are to be purchased. Such requests, as well as inquiries about GSA purchases and purchasing specifications, should be addressed to F. G. Moyer, Room 7100, Central Contract Inquiry Office, Bureau of Federal Supply, General Services Administration, 7th and D streets S. W., Washington 25. Or you can phone Mr. Moyer on DIstrict 5700, Extension 697.

Chances are that you can make something that is procured by GSA. It regularly buys nearly 50,000 different articles and services. The purchases generally are made through Washington, but you also should keep in touch with the GSA Supply Center in your area which places "spot" or "interim" orders. These GSA supply centers are located in New York, Boston, Cleveland, Chicago, Kansas City, Atlanta, Fort Worth, Tex., Denver, San Francisco, Los Angeles and Seattle.

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Parking Problems?

Parking meter makers have troubles, too. Market for original units nearly used up

NICKELS, dimes, quarters and pennies are pouring into more than 850,000 parking meters now in use throughout the United States.

Only 62,000 meters were in use ten years ago, and the first meter was put into operation in 1935 in Oklahoma City. The eight companies selling parking meters have experienced a declining volume this year which is estimated at 10 to 30 per cent below the 1948 peak. The industry in 1949 will sell about 200,000 meters; 33,000 were marketed in 1939. Its sales volume will be $12 million, compared with $1 million in 1939.

Future in Replacements — Future of the industry is in replacements because the market for original sales is about 80 per cent used up. Meters for parking lots may be one answer to the problem.

The average parking meter may contain from 100 to 500 parts depending on whether it's automatic or manually wound by the parker. The trend is toward simpler mechanisms. Steel, stainless steel, brass and zinc die castings are used in most meters. Basically a parking meter consists of a timer, signal and a coin-operated mechanism for setting the first two elements.

Babson Had a Patent—Roger Babson, the economist of Wellesley, Mass., applied for the first patent on a parking meter in 1929. His device had no signal. The inventors of the first meter used commercially were Carl Magee and G. A. Hale. Mr. Magee, a newspaper editor, studied Oklahoma City's traffic problems and thought of a parking meter. He contacted Mr. Hale of Oklahoma A. & M. College and the two worked out the mechanical details.

These are among the companies or their direct descendants who became interested in meters in the middle 1930s: Magee-Hale Park-O-Meter Co., Oklahoma City; Mi-Co Meter Division of Michaels Art Bronze Co. Inc., Covington, Ky.; M. H. Rhodes Inc., Hartford, Conn.; and Miller Meters Inc., Chicago. Most meters are not sold to the city; they are installed at the manufacturers' cost. The maker gets a percentage of the receipts; the city gets the rest. Cost now is about $65 per meter, compared with $55 in 1939.

Round Chain's 80th Anniversary

THIS month marks the 80th anniversary of the Round Chain organization.

Its five associate companies—Cleveland Chain & Mfg. Co.; Bridgeport Chain & Mfg. Co., Bridgeport, Conn.; Round California Chain Co., So. San Francisco, Calif.; Seattle Chain & Mfg. Co.; and Woodhouse Chain Works, Trenton, N. J.—are joining in the celebration of the founding. Established in 1869 by David Round, the organization has been continuously managed by members of the Round family. Raymond L. Round, grandson of the founder, is president. He serves as chairman of the board of all the Round associate companies.

Round manufactures chains ranging from small links used in instrument manufacture to massive anchor chains.

GENERAL IKE PRESENTS AWARDS: Three top prizes in employee publication division of Freedoms Foundation Inc. went to steel company magazines. All hold membership in the Northern Ohio Industrial Editors Association. Gen. Dwight D. Eisenhower gave the awards to John A. Jones, editor, Weirton Steel Co.; Wm. D. Martin, editor, Republic Steel Corp.; and C. F. Hood president, American Steel & Wire Co.

CALENDAR OF MEETINGS

Dec. 6, Material Handling Institute: Annual meeting, Hotel Commodore, New York. Institute headquarters are in the Clark Bldg., Pittsburgh.

Dec. 7-9, National Association of Manufacturers: Congress of American industry, Waldorf-Astoria Hotel, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 8-10, American Institute of Mining & Metallurgical Engineers: Seventh annual conference of Electric Furnace Steel Committee. Institute headquarters are at 29 W. 39th St., New York.

Dec. 9, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

Dec. 12-15, National Warm Air Heating & Air Conditioning Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Society for Savings Bldg., Cleveland.

Dec. 21-22, National Electrical Manufacturers Association: Fouth annual national farm electrification conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-12, Society of the Plastics Industry: Reinforced plastics division meeting and fifth annual technical session, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

Jan. 12-13, Southern Supply & Machinery Distributors' Association: Industrial distribution forum and midyear meeting, Edgewater Gulf Hotel, Biloxi, Miss.

Jan. 16-19, Plant Maintenance Show: Sponsored by American Society of Mechanical Engineers and Society for the Advancement of Management, at the Public Auditorium, Cleveland. Mechanical Engineers' headquarters are at 29 W. 39th St., New York.

Jan. 18-20, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York.

Jan. 22-24, Institute of Scrap Iron & Steel Inc.: Annual convention, Hotel Statler, Washington. Institute headquarters are in the Dupont Circle Bldg., Washington.

Jan. 23-24, Industrial Furnace Manufacturers Association: Meeting, Dearborn Inn, Dearborn, Mich. Association headquarters are at 420 Lexington Ave., New York.

Jan. 23-27, American Society of Heating & Ventilating Engineers: Southwest air conditioning exposition, State Fair Park, Dallas, Tex. Society headquarters are at 480 Lexington Ave., New York.

Jan. 30-Feb. 1, American Material Handling Society, Chicago Chapter: Midwest material handling conference, in conjunction with Illinois Institute of Technology, in Chicago.

Feb. 12-16, American Institute of Mining & Metallurgical Engineers: General meeting, Hotel Statler, New York. Institute headquarters are at 29 W. 39th St., New York.

ITALY... Conditions in Their Economies Are Poles Apa

The Italian economy is sluggish. Things are bad, but nobody knows how bad because past figures are unreliable. Drought cuts power and industrial output

ITALIAN economists and businessmen are in much the same fix as the gas station attendant who broke his hydrometer while testing the antifreeze in an automobile radiator. Undaunted, he stuck his finger in the solution, tasted it and shouted: "It's good for ten below zero." A hydrometer check at another station proved him nearly right.

Italians have their fingers to test the economic specific gravities, but all their hydrometers are in poor shape. Figures and indexes from the Mussolini era are unreliable; wartime business indicators are almost nonexistent; postwar trends have been as varying as weather.

Industrial Output Down—For what it's worth, the industrial production in fiscal 1948-1949 was 95 per cent of the 1938 level. Power output was 142 per cent of the 1938 production. Many businessmen say these government figures are highly optimistic. But everybody agrees that things are bad, even though they don't know how bad. Export trade is weak; the internal market sluggish; labor troubles persist (but less seriously); worker productivity lags; production costs are high.

Contributing to the recession is a drought. This has caused a power shortage which has curtailed industrial output. Italy is a pauper in coal and must rely almost entirely on water to generate its electricity. Much of its industrial planning was based on a power output this year far greater than the 142 per cent increase over 1938 production.

Steel Output Slips—Production of steel ingots and castings this year will slip to about 2,227,500 net tons, compared with the 2,337,500 tons produced in 1948. Output of semifinished will advance because more rolling capacity is in operation now than last year.

The steel industry is modernizing and expanding, notably the iron and steel works in the Bagnoli and Piombino districts in central and southern Italy. The complete program involves reconstruction of seven blast furnaces and auxiliary equipment including coke ovens and the addition of one 750-ton furnace. Two basic bessemer plants will be reconstructed and about 880,000 tons of open-hearth capacity added. Rolling mills, including an 80-inch hot strip mill with auxiliary equipment, are part of the program. The estimated cost of the complete project is about $250 million, of which $60 million will be spent in the United States.

Steel to Subsidized Industries—Much steel in the past year went to government-subsidized construction, railroad and shipbuilding industries. A housing shortage persists, but it's no longer acute. Railroads have resumed their prewar passenger service, but, as Italians say, it was no good in 1938 either. Freight traffic will come near to the 1938 average, statistics maintain. The Italian merchant fleet is about 70 per cent of what it was in 1940, a remarkable record even if only partly true because of the heavy damage during the war. Italian shipbuilders are the most active in continental Europe; they are working on contracts now for 250,000 gross tons of shipping.

Automakers this year are outproducing what they did in 1948, but their full capacity still isn't used. About 68,000 vehicles will be assembled this year, compared with 56,000 in 1948. Engineers at Fiat's Turin works have high hopes for a new low-priced entry in the world car market. It will be ready by spring, with a come-hither look for foreign currencies. Its production is made possible by ECA loans.

Italy and Devaluation—Europe's financial juggling last September has yet to have much effect on Italy. The lira is cheaper, but so are most other European currencies. France and Western Germany, the major suppliers of the industrial products Italy can't make herself, devalued in about the same proportion as Rome. Autos are Italy's chief industrial export; other industrial exports don't amount to much. She pays for imports of industrial goods with farm products.

Even official estimates place Italian agricultural production at only 87 per cent of 1938 output. But this is good considering the havoc war brought to southern Italy and the islands, the area for much of the farm production.

Public Finances Better—Showing the most improvement in the entire Italian economy is public finance. The state's net income in fiscal 1948-49 covered only 67 per cent of expenses. In the current fiscal year, it will cover 86 per cent.

Italy has a tough row to hoe to reach Marshall Plan objectives by 1952. Agricultural production should by then be 15 per cent above the 1938 level, an index accepted because nothing else is available; now output is 15 per cent below that. Industrial production should be 40 per cent above the 1938 level; it's 5 per cent below now. Power generation should be 100 per cent above 1938 output; it's only 42 per cent

THE ITALIAN AUTO INDUSTRY STILL ROLLS

. . . but even it operates below capacity in a sluggish economy

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Both Nations Have Some Similar Problems . . . SWEDEN

above now and no improvement in sight.

Italian Income Levels Off—The Italian national income is estimated at $10 billion in 1938 (calculated in terms of 1948 purchasing power), at $8350 million in 1947, at $9.5 billion in 1948 and at about $9.4 billion for 1949. The Marshall Plan target is $12,350 million by 1952.

The Marshall Plan calls for reorganization and modernization, not great expansion, in industrial production. Italian industry will maintain its traditional role of a finishing industry, producing eventually nearly all the manufactured goods the country needs. Any expansion will come in capital goods industries to increase production for the home market by 50 per cent in 1952.

Shift in Imports Needed—Marshall Planners hope that Italy's industrial reorganization and development of agricultural production will enable her by 1952 to concentrate most of her imports on raw materials and semifinished products (66 per cent). Foodstuffs will no longer average more than 23.5 per cent of imports (31 per cent in 1947) and manufactured products only 10.5 per cent (of which 6.5 per cent will be machinery). Still the great barrier to realization of all these goals is the freeze in investment capital. Marshall Plan funds provide only a partial thaw. Italian government expenditures are large, but not large enough. Italian industries' capital resources are small. The question is: Will American private investors provide the antifreeze?

WITH this issue, the editors of STEEL begin a series of articles on what happened in 1949 and what's likely to occur in the future economically for the major Western European countries. Next week, Dec. 12, we will deal with Belgium, Luxemburg and France. Western Germany and Great Britain will be studied Dec. 19. A summary of the situation in Britain and on the continent will appear Dec. 26. Complete iron and steel statistics for all industrial nations of the world will be carried in our 1950 Metalworking Yearbook issue, Jan. 2.

Sweden is thriving despite a leveling off expected to continue into 1950. She is one ERP nation which seems certain to meet Marshall Plan goals

SWEDEN stands out like a neon light in the gloom of the rest of the ERP nations.

Her budget is balanced, even has a surplus. Her economy is relatively stable. She has to repair no war damage, a factor which drains the capital of all her neighbors. She is a moderately socialized state, the first in Europe of the genre now followed by Britain and to at least some extent by every other Western European nation but Belgium. Whatever the merits or demerits of socialization, Sweden long ago recovered from the pains of transition.

Sweden Still Has Troubles—Even so, she still has troubles. Like everyone else she has a dollar deficit and is struggling to surmount it. Her economy before the war was tied closely to Germany's. She's now adrift. Her major exports before the war were forest products. Her forests are being depleted, and the government is curtailing lumbering.

In trying to stall inflation, the government had to put mild curbs on speculation. Sweden is trying to switch more to finished manufacturing of specialty steels, precision industrial equipment and products. The evolution to greater emphasis on manufacturing may bring a near-revolution in the Swedish economy. She was forced to devalue the kroner when everyone else juggled their currencies. The result has been more tension on the economic system.

Production Rising — Agricultural and industrial production has increased steadily in the past two years. It will probably level off in 1950 because demand is subsiding. Industrial expansion, although slowing up in its rate of growth, is still far above prewar levels. Greatest expansions have so far been made in power plants, iron and steel works, in the engineering industries and in residential building. Other fields which need new construction, but previously held back by the government, will soon get their innings. They are schools, hospitals, highways, railroads and the telephone and telegraph systems.

Metalworking fabricators are the largest steel consumers in Sweden; they use about half of the nation's entire production. They consumed about 715,000 net tons in 1948, nearly the same in 1949 and perhaps will use slightly less in 1950.

Shipyards Expand—Swedish shipyards have increased steel consumption considerably since the war. Yards in 1946 could build 175,000 gross tons of shipping yearly; now they can build 250,000 tons. Swedish merchant fleet has expanded, and the nation has become an important exporter of shipping. Her builders account for 10 per cent of all the world shipping constructed for export. The best customer is Norway. Sweden has been hit by the lull in shipbuilding, but not too hard. She has enough contracts for satisfactory operations over the next two years.

In spite of increasing international competition, Swedish iron and steel works have increased their exports satisfactorily. In the first six months of 1949, shipments abroad of pig iron totaled 15,180 net tons, compared with 11,880 tons in the corresponding 1948 period. Respective figures for iron and steel product exports were 82,280 tons and 67,210 tons. Exports of iron ore also soared, rising by 768,900 tons to 6,241,400 tons in the first six months of 1949.

Target Should Be Hit—Sweden is aiming right at the Marshall Plan target for 1952 and will probably score a bull's eye. The gross national product is increasing satisfactorily and is expected to be 10 per cent above the 1947 level by 1952. Exports are increasing and should show a 25 per cent gain over 1947 by 1952. The investment ratio (gross investments in percentage of the gross national income) has nearly reached 21.2, a level originally not anticipated until 1952. The ratio in 1938 was 20.4

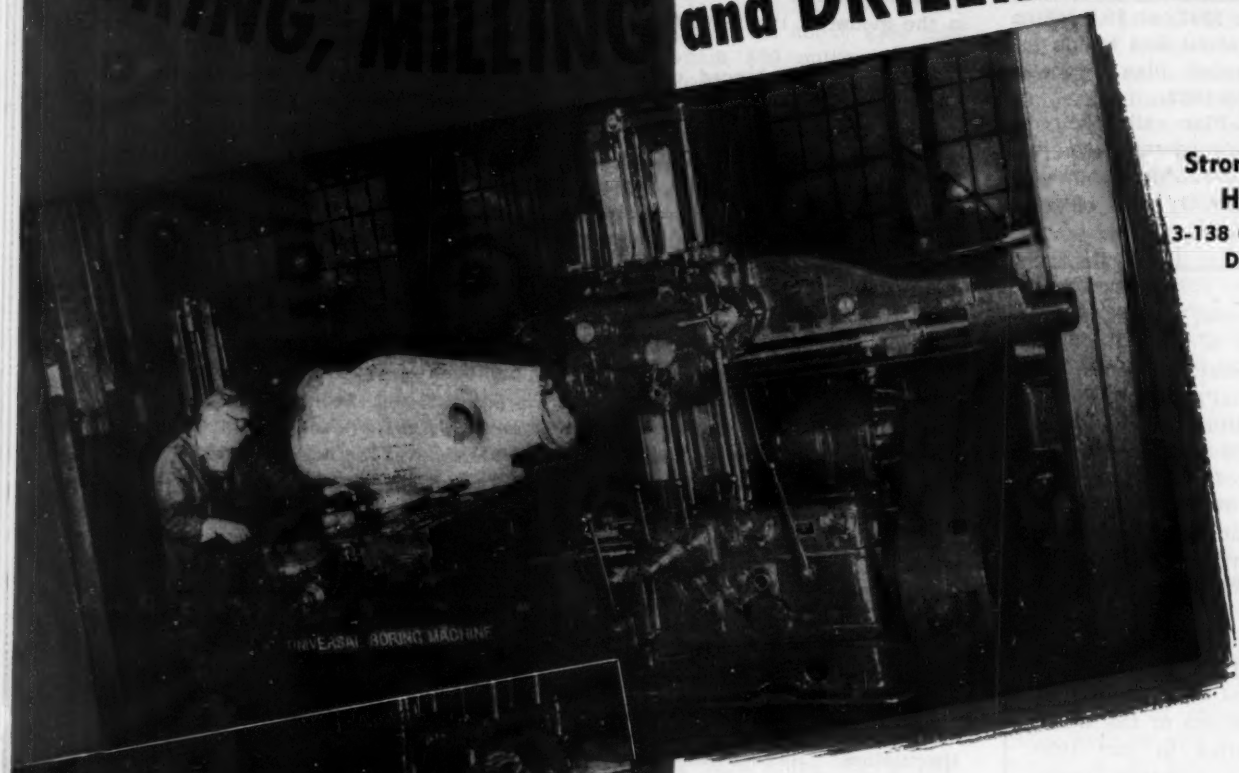
By 1952, total investments in the various sectors of the economy will be: Manufacturing industries (paper, iron and steel, engineering and chemicals) $486 million; public investments (electric railways, telephone and telegraph services and construction) $470 million; housing $403 million; hydroelectric plants $180 million; and other investments $333 million.

Sweden's balance of payments in all currencies will be satisfactory by 1952. In fiscal 1949-50 her gold and dollar deficit will be about $70 million; it was $80 million in fiscal 1948-49.

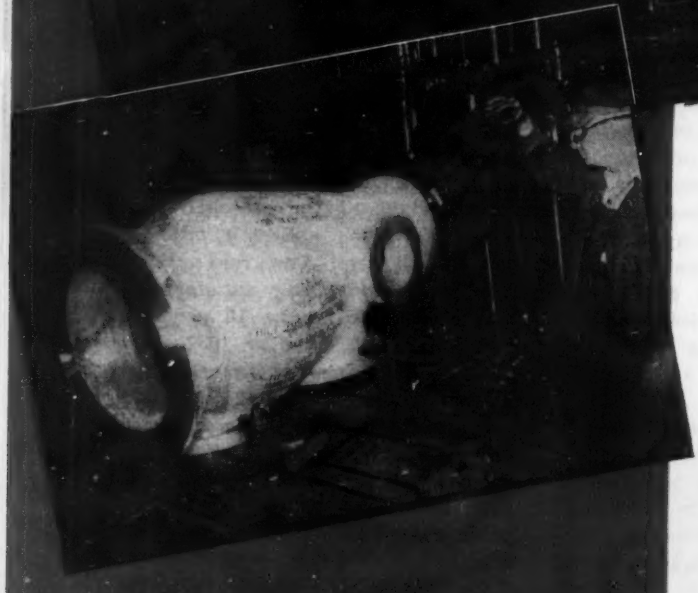
BULLARD

Universal

BORING, MILLING and DRILLING MACHINE



DEALERS
Strong, Carlisle and Hammond Co.
3-138 General Motors Bldg
Detroit 2, Mich.



Saves Time and Set-Ups on Bulky, Hard to Handle Jobs

THE Bullard-Universal Horizontal Boring machine is just the tool for those bulky, clumsy or hard to handle jobs where boring, turning, drilling and milling operations are required. It is also very frequently the case that once the part is clamped in place a series of operations can be performed merely by manipulating table and spindle adjustments. The machine saves time and labor costs of extra set-ups and transfers from machine to machine.

Some outstanding features of Bullard-Universal are: centralized right hand controls at convenient operating height, Hydrodynamic coupling of main drive providing smoothness of power flow, rapid reverse at any speed and safety electric pendant control.

The Universal machine is so versatile, economical and so conveniently operated that it has a definite place in any shop handling Diesel-Electric engine repairs.

The Bullard Company is now the manufacturer of the previously well-known Universal Horizontal Boring, Drilling and Milling Machines. Bullard is therefore prepared to meet the service requirements of Universal Boring Machine customers as well as potential users of these machines.

Bullard-Universal built in 3", 4" and 5" spindle sizes with choice of varied bed lengths and post heights.

Write for details.

THE BULLARD COMPANY BRIDGEPORT 2, CONNECTICUT

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Cadillac produces millionth automobile. Past year's production 39 per cent greater than best previous model, indicating increase in buyer incomes

DETROIT

THE first million may be the hardest, so Cadillac let out some justifiable cheers as car No. 1,000,000 glided off the assembly line Nov. 25, climaxing the greatest year in the division's 48-year history. Production of 1949 models, at 92,554, was 39 per cent higher than any previous model, reflecting the large number of buyer incomes which have moved up to the Cadillac class as well as the more generous allotment of steel from the General Motors pool, in comparison with other GM divisions.

Nearly a quarter of Cadillac's million represent postwar production, and out of the 750,000-odd built in the 1902-42 interval, 227,000 remain in service, indicating scrappage of well over half a million units over the 48 years.

Price Ratio Narrows — Fifteen years ago the average price of a Cadillac was more than 4½ times that of the average price of all cars sold in the automotive industry. This ratio has been reduced gradually until today the average Cadillac price is only 1.6 times the average for other passenger cars. Seven manufacturers have models selling at a figure higher than the lowest-priced Cadillac, according to spokesmen for the division. From this it might be inferred they are trying to soft-pedal the fact that Cadillac is regarded almost universally as the cream of the luxury field, a belief which might well be reinforced, instead of moderated, since it has been built up over a long period of years.

Craftsmanship a Creed—For many years there has been a sign emblazoned on one of the Cadillac buildings in Detroit reading "craftsmanship a creed—accuracy a law." Through equipment, materials selection and manufacturing processes a determined effort has been made to live up to this precept, often to the point of overdoing it, in some opinion. For one thing, there has always been a high factor of safety built into all components and subassemblies which added to the poundage of the vehicle, at some sacrifice of economy, yet at the same time enhanced riding qualities and overall elegance.

Cadillac claims credit for pioneering many of the fundamental principles and mechanical designs adopted widely throughout the industry—the first V-8 engine in 1914, the electric starter in 1922, electric lighting and the closed body, synchromesh transmission, knee-action suspension, no-draft ventilation, etc.

New Models Jan. 17—All Cadillacs are built in Detroit, and when the switch was pulled on the assembly line ten days ago there were 7700 new cars in dealers' showrooms and 1400 more in transit to them. This is the equivalent of a little over one month's production which should be cleaned up by the time 1950 models are shown initially, in New York, Jan. 17, just ahead of the ten-day show which General Motors again will sponsor at the Waldorf-Astoria, starting on the 19th. Sights are being drawn by Cadillac sales officials on a 1950 season as good or better than the one just concluded. Manufacturing operations on next year's line will start Dec. 5 and it probably will be a week or two before final assemblies are realized. While it has been denied that the division will have a "small" car in the new series, trade reports indicate the 61 model will make use of the General Motors "B" body series, somewhat smaller dimensionally than the "C" group used on the balance of the line.

Chevrolet Plants To Resume—Chevrolet has announced its schedule of plant shutdowns for inventory and model change. Most of the division's 13 manufacturing plants closed Nov. 23 and were slated to resume either this week or next. All of the 11 assembly plants closed Nov. 30. Truck assembly will pick up Dec. 12 and passenger cars the following week. A considerable number of the 65,000 hourly-rated employees of the 24 plants remained on the job during the changeover.

Longer closings in GM divisions were averted by the corporation's forehandedness in buying about three weeks' extra supplies of steel last summer. Although there was no certainty of steel production being interrupted when this buy was made, the expiration of steel industry labor contracts in July appeared to justify a little stockpiling, so a substantial sum of money, running into the millions, was earmarked for the purpose. Starting Oct. 1, this material proved a lifesaver and permitted keeping most plants on a five-day week, the remainder on four days, through most of November and necessitated trimming only 130,000 units from 1949 production schedules. At the same time, approximately 150,000 cars and trucks were built which might otherwise have been lost, except for the steel purchase. Figuring roughly 2 tons of steel per unit, stockpiling must have come close to 300,000 tons, one reason for the rebound in the national steel operating rate last summer.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	601,021	516,814
November	444,600*	495,488
December	.....	514,337
12 mos.	.....	5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Nov. 12	114,856	116,029
Nov. 19	115,152	120,718
Nov. 26	74,946	89,482
Dec. 3	45,000	125,170

Estimates by Ward's Automotive Reports

K-F Placing Light-Car Tooling

KAISER-FRAZER has placed some of the tooling for its projected low-priced car with local shops, although some of the old-line suppliers in this field who sat in on conferences at Willow Run to discuss the tool and die program are of the opinion that K-F is expecting some sort of major miracle by trying to compress a 30-week job into 15 weeks. One die expert here said the prints he saw were not even dimensioned. He feels K-F will have a tough row to hoe over the next few months in this brand new program because its tool-

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ing and production planning talent has been thinned down far below what it was in the immediate post-war period when E. J. Hunt was master-minding Willow Run operations.

Tool and die projects in general are slow and there is intense competition in the trade, with a lot of the old "politics" involved in placing business. A fair amount of work is being placed for the Ford transmission plant in Cincinnati, and presumably Borg-Warner will have similar projects for its share of Ford transmission production. However, the latter may not come into the Detroit area, since the plant will be in the Chicago district.

Ford Styling Engineer Quits

LATEST change in the executive ranks at Ford involves the resignation of John Oswald as executive engineer in charge of body styling and engineering. He is a former General Motors body stylist who went with Ford shortly after the start of the executive realignment there. No reason has been given for his departure, but it is known that he did not see eye-to-eye with George W. Walker, industrial designer, who has been in and out and in again as a consulting stylist. The next body types to be built by Ford are now taking shape on drawing boards and in mockups, and apparently what Mr. Walker liked Mr. Oswald did not, so with Mr. Walker now supervising the styling of the entire Ford line of cars, trucks and busses, there was nothing to do but part company.

Ford Buffalo Plant Awarded

MAJOR construction contract for Ford's Buffalo pressed steel plant has been awarded to Bryant & Detwiler, covering brickwork, steel sash and glazing, steel siding, roofing, air conditioning, heating and plumbing and electrical facilities. Bethlehem is now erecting the structural work and will be finished about Dec. 15.

IHC Offers Heavy Trucks

INTERNATIONAL Harvester Co. is digging in for a real battle to capture a larger share of the heavy-duty truck market, with a completely redesigned and re-engineered line of 87 basic truck chassis models, backed by three years of road testing, during which time more than 3 million miles of every kind of road were traversed. Highlighting features of the new L-line are: Complete restyling to blend streamlining with practicability, redesigned cabs to provide more roominess, added comfort and convenience, altered chassis dimension engineering permitting better load distribution, greater maneuverability, improved engine accessibility and short overall lengths while maintaining or increasing load-carrying lengths, and refined valve-in-head engines.

Headed by four classifications of four-wheel models, ranging in gross vehicle weight from 4200 to 30,000 pounds, the new line also features multistop units built at the company's Bridgeport, Conn., plant, a group of six-wheel chassis units, ranging in GVW from 22,000 to 50,000 pounds, and a group of cab-forward chassis units, ranging upward from 14,000 pounds. Two highway-type and four off-highway trucks, ranging from 20,000 to 90,000 pounds, will be built at Harvester's Emeryville, Calif., plant.

Principal change in chassis dimensions is in the wheelbases which have been shortened as much as 7 inches. This, together with reproportioned cab-to-rear dimensions and front-to-cab dimensions, has resulted in a shifting of load weight so that it is in balance between front and rear axles. Likewise, overall lengths are reduced, with no decrease in load-carrying lengths. Cabs include such features as a curved contour instrument panel, conveniently-located instruments and a large one-piece windshield curved to minimize eye-strain and reduce glare.

Heavy Truck Output Drops

A GLANCE at truck production statistics for this year shows the steepest declines in the gross vehicle weight range from 10,000 to 26,000-pound range. In the 5000-pound and under category, output has stepped up 25 per cent from a year ago, but in other classes the trend has been downward, except for the so-called "heavy-heavy" units which are just about holding their own at 1500 per month. In the 14,000-16,000-pound range, for example, assemblies in October, 1948, were 22,808, dropping to only 9788 in the same month this year, while in the 10,000-14,000-pound group production collapsed from 14,203 to 5326.

INTERNATIONAL HARVESTER DIGS IN

. . . to capture larger share of the heavy-duty truck market

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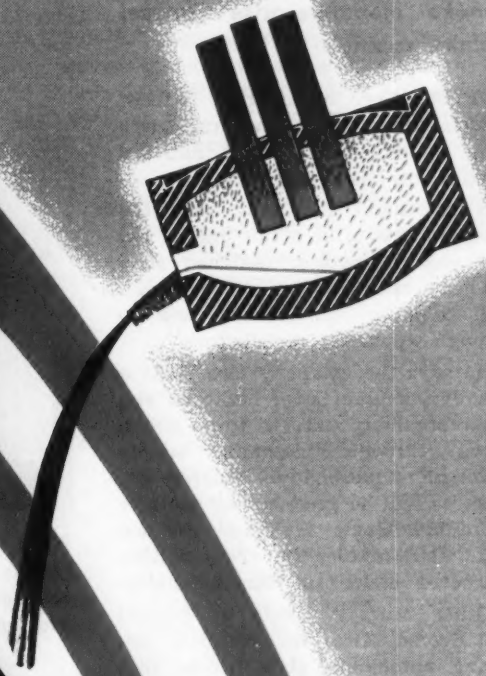
ARISTOLOY STEELS

HIT THE MARK



Fire clay hot tops and big end up ingot molds assure sound interior quality.

ARISTOLOY STEELS

STANDARD STRUCTURAL ALLOY
BEARING QUALITY • ALLOY TOOL
SPECIALTY • NITRALLOY
CARBON TOOL • STAINLESS
MAGNAFLUX • AIRCRAFT QUALITY

COPPERWELD STEEL COMPANY, WARREN, OHIO

117 Liberty Street
New York, New York

1578 Union Commerce Building
Cleveland, Ohio

529 Fisher Building
Detroit, Michigan

176 W. Adams Street
Chicago, Illinois

7251 General Motors Building
Detroit, Michigan

3104 Smith Tower
Seattle, Washington

P. O. Box 1633
Tulsa, Oklahoma

403 W. Eighth Street
Los Angeles 14, California

Monadnock Building
San Francisco 5, Calif.

In Home Appliance Field

Murray Corp. of America will make moderate-price ranges, sinks, cabinets

MURRAY Corp. of America, Detroit, intends to enter the moderate-price home appliance field on a national distribution basis early next year.

B. C. Gould, president, says the company will offer a full line of gas and electric ranges, matched steel kitchens, cabinet sinks and base and wall cabinets. Distribution will be through appliance distributors.

He says the company also plans a line of porcelain steel bathtubs and other plumbing fixtures to be distributed through plumbing supply wholesalers nationally. Murray appliances will be produced at the new $7 million Home Appliance Division plant at Scranton, Pa. They will be marketed under the Murray name.

Other Murray plants at Detroit and Ecorse, Mich., will continue supplying automobile steel bodies, fenders, cushion springs and chassis frames to major automotive manufacturers.

Laclede-Christy's 14th Unit

LACLEDE-CHRISTY Co., Pittsburgh, acquired the capital stock of Diamond Fire Brick Co., Canon City, Colo.

The purchase gives the fire and glass industry refractory manufacturer its 14th manufacturing unit. It now owns eight and is affiliated with six other plants. The deal was largely a cash transaction, says D. N. Watkins, president of the company. Controlling interest in Diamond was formerly held by American Arch Co. of New York. The plant produces fire clay and silica brick.

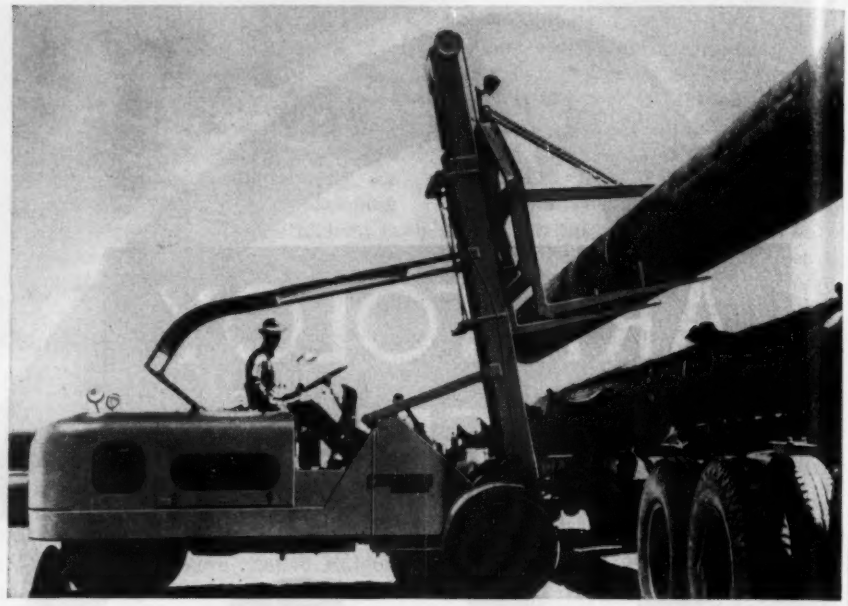
Laclede-Christy has realized ownership of four plants in the past five years: At Birmingham; Osceola Mills, Pa.; Warm Springs, Calif.; and the one at Canon City.

Mississippi Valley Buys Flint

ENTIRE stock of Flint Structural Steel Co., Flint, Mich., was bought by Mississippi Valley Structural Steel Co., an Illinois corporation.

R. D. Wood, chairman of the board, and J. B. Butler, president of the St. Louis, Mo., company, say plans call for full integration of the activities of Flint and Mississippi Valley. No changes of organization personnel are contemplated, and financial details were not disclosed.

Flint, established in 1932, is known as a steel fabricator. It has large warehouse stocks of rolled steel material for immediate delivery. Mississippi Valley, started in 1902, operates plants at Decatur, Ill.; Melrose Park, suburb of Chicago; and Maplewood, suburb of St. Louis.



BIG GRAB: Old timers said: "It won't work." But Gerlinger Carrier Co., Dallas, Oreg., developed a specially engineered hydraulic grab arm to load 60-foot sections of steel pipe on trailers and truck bolsters. There is positive hydraulic pressure on both forks and the upper grab arm, making it possible to securely grip the load

Metal Goods Buys Bus Terminal

BUS TERMINAL, formerly owned by St. Louis Public Service Co., was bought by Metal Goods Corp., St. Louis. The company plans to use it as a warehouse, plant and general office. Alterations are being completed, and Robert Grote, president, says it will be occupied after the first of the year.

His company distributes, stocks and fabricates aluminum, brass, copper, stainless steel, monel and nickel. The building contains 38,000 sq ft of floor space.

Gets Kinney Mfg. Stock Control

TO DIVERSIFY the business of New York Air Brake Co. its management acquired the controlling stock interest in Kinney Mfg. Co., Boston.

Principal Kinney products are mechanical high vacuum pumps and pumps for handling viscous liquids. Although application of the vacuum and liquid pumps covers a cross-section of American industry, the electric lamp, radio and television tube, atomic energy, electric power, petroleum and chemical industries are among the largest users. The manufacturing processes are similar to those in the manufacture of air brakes, but sales are wholly outside the railroad industry.

Two Plants Bought from GSA

ALICE G. HANSEN, president of Pittsburgh Mill Steel Co. Inc., announced the purchase of two large industrial plants from the General Services Administration. Plants are in the Philadelphia and Baltimore areas.

The purchase involved 35 buildings on about 25 acres of land, making 272,000 sq ft of industrial space available under cover.

The Baltimore plant has a magnesium castings division designed by Anaconda Copper Co. during the war. A main foundry division, completely equipped for production of gray iron castings and soil pipe, normally employs 600 men.

Both plants have a wide variety of equipment: Heat treating furnaces, machine shops and cranes. Adequate floor space would permit the company to consider other forms of manufacture.

The Crum Lynne plant near Philadelphia, has an electric melt division for production of carbon and alloy steel castings or ingots. It is also equipped to produce specialty gray iron castings in the foundry. When the plant is running at full tilt, about 200 men will be employed.

Pittsburgh Mill Steel's engineers are determining production procedures. After they are completed, plans for the operation of the plants will be made public—in about 30 days.

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Briefs . . .

E. W. Bliss Co. appointed five new sales representatives for the company's complete line of mechanical and hydraulic presses: Stedfast & Roulston Inc., Boston, will cover Maine, New Hampshire, Vermont, Rhode Island and the eastern sections of Connecticut and Massachusetts; Lakeshore Machinery & Supply Co., Muskegon, Mich., western Michigan; Wm. S. Bolden Co. Inc., Charleston, W. Va., West Virginia; Corry's Machine & Tool Inc., Davenport, Iowa, Iowa and part of Illinois; and Ellfeldt Machinery & Supply Co., Kansas City, Mo., eastern Kansas and western Missouri.

—o—

Whiting Corp., Harvey, Ill.—foundry equipment—appointed Carl F. Miller & Co., Seattle, as an agent.

—o—

Ward Leonard Electric Co., Mt. Vernon, N. Y.—electric controls—opened a new St. Louis branch office. Charles B. Durling Jr. is district manager. Storer & Schemm, Cincinnati representative of the company, changed its name to Sheldon Storer & Associates.

—o—

Products of **Belfield Valve Division** of Minneapolis-Honeywell Regulator Co. will be promoted and sold through 74 Honeywell branch offices in the U. S., Canada and Europe, says L. M. Morley, vice president and general sales manager of Brown Instruments Division.

—o—

Woven Wire Fabrics Division of John A. Roebling's Sons Co., Roebling, N. J., named three new agents for insect wire screening, galvanized hardware cloth and industrial wire cloth: Flynn & Enslow, San Francisco; Industrial Wire Products Corp., Los Angeles; and Pacific Wire Works Co., Seattle.

—o—

Glendenin Bros. Inc., Baltimore—copper nails, nuts, rivets, stampings—completed plans for erection of a new one-story plant. It will be finished next spring. Last year the company added a new department to its plant for manufacture of aluminum nails.

—o—

Crown Can. Co., subsidiary of Crown Cork & Seal Inc., will merge its Baltimore plant with its Philadelphia plant at yearend. General offices and main plant of Crown Can are in Philadelphia.

—o—

Landsverk Electrometer Co., Cincinnati, is again active in design and manufacture of quartz fiber instruments for radiation detection and measurement. O. G. Landsverk was closely associated with the development of the instruments at the Metallurgic Laboratory of the University of Chicago. Some of them were used to assess the radiation hazard on the beaches of Bikini; other special units were used to measure the gamma ray intensity of the atom bomb. The quartz fiber field, says Mr. Landsverk, is in vigorous growth.

—o—

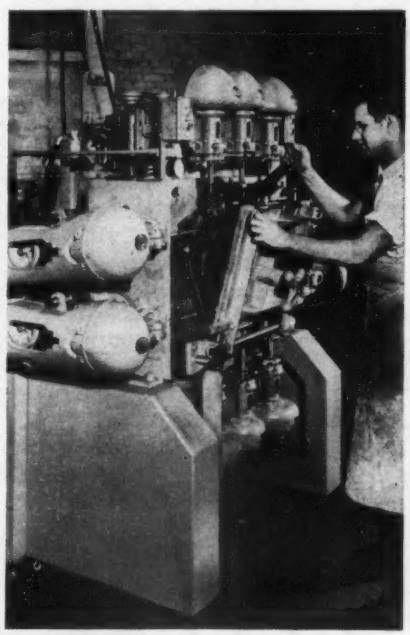
Peterson Steels Inc. which had its main office in New York transferred activities and personnel to a new office in Newark, N. J. There Peterson Steels has conducted its warehouse activities for many years.

—o—

Whitney Chain & Mfg. Co. Division of Whitney Hanson Industries Inc. moved to new and larger headquarters in Chicago. The modern building has 15,000 sq ft of floor space. A complete stock of American Standard roller chains, silent chains, conveyor chains, couplings and sprockets are available from stock.

—o—

Ready Tool Co., Bridgeport, Conn., acquired all the patent, manufacturing and sales rights of the Barter-Ritco Reversible Grinder Dog, formerly manufactured by Rhode Island Tool Co., Providence, R. I. Machinery and equipment for the grinder dog will be transferred to the Ready plant in Bridgeport; sales will be handled by the company's sales organization throughout the world.



LABOR COST REDUCED: To machine a special casting, Delta Mfg. Division of Rockwell Mfg. Co., Milwaukee, chose to use a single purpose machine. Although its initial cost was greater than using jigs and machine tools, Delta reduced the labor cost on the initial run from 14 and 18 cents to 5 cents per casting

—o—

Vaughan Novelty Mfg. Co., Chicago, changed its name to Vaughan Mfg. Co. The change does not affect the corporate structure, management, personnel or policies of the company.

—o—

Douglas Furniture Corp.—chrome dinettes—will shortly begin operations in its new plant in Chicago. The new plant is expected to be in full operation at the end of this week.

—o—

Solem Machine Co., Rockford, Ill., bought Merritt Plywood Machinery Co., Lockport, N. Y. The plant, used for design and manufacture of machinery for production of veneers and plywood, was acquired from Merritt-Monsanto Corp. in October by a group of Cincinnati businessmen. Robert H. Solem, executive vice president of the Rockford company, will become general manager of the Lockport plant. It will be operated as the Merritt-Solem Co.

—o—

Standard Transformer Co., Warren, O.—transformers for distribution, power, metering, testing and street lighting—appointed Bradley Co., Washington, as its representative for Virginia, Maryland and the District of Columbia.

—o—

Azed Inc.—detergents and accelerators for pickling baths, addition agents for galvanizing and zinc electroplating baths and secondary treatments for zinc surfaces—appointed J. H. Overpeck Co., Pittsburgh, as distributor for western Pennsylvania, eastern Ohio and northern West Virginia. Azed Inc. is a joint venture of Acme Steel Co. and Poor & Co.

—o—

Simonds Abrasive Co., Philadelphia—grinding wheels and abrasive grains—appointed Van Kleeck-Wilson Inc., Buffalo, as distributor for its products in the Buffalo area. The Buffalo firm was organized by H. R. Van Kleeck, formerly sales manager of Oliver Abrasive & Tool Co., Buffalo, and Frank M. Wilson, formerly manufacturer's representative who offered specialized service in abrasives and tools in Buffalo.

—o—

Electro Chemical Supply & Engineering Co.—jointing material for water pipes, sulphur and resin cements and natural and synthetic rubber coatings and linings—moved its offices from Paoli, Pa., to its new office and plant in Emmaus, Pa. The company just appointed H. D. Fowler Co. Inc., Seattle, as agent in the Northwest.

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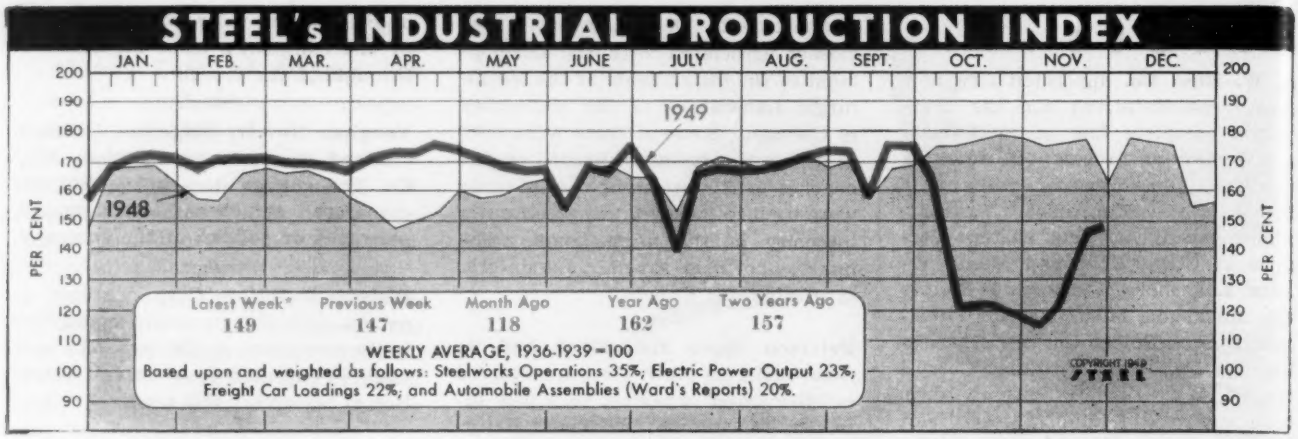
STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1948
1949
PER CENT
Latest Week* 149
Previous Week 147
Month Ago 118
Year Ago 162
Two Years Ago 157
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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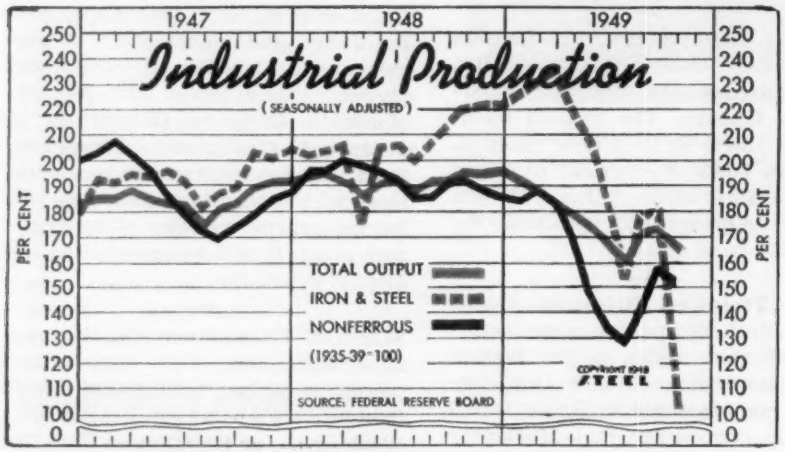
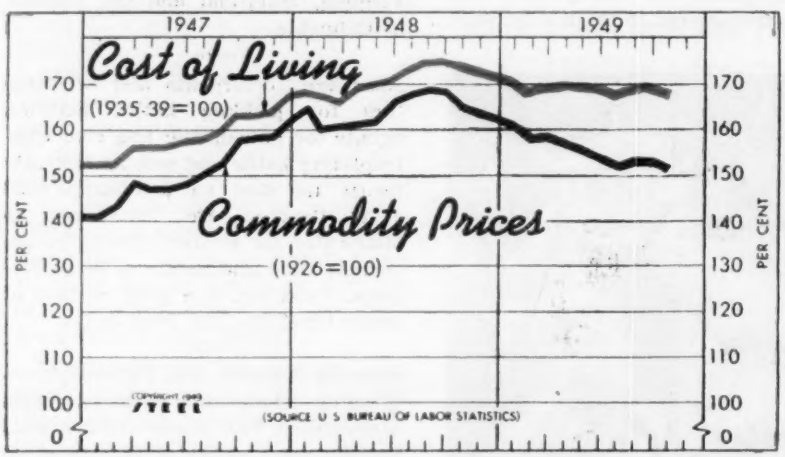
*Week ended Nov. 26 (preliminary).



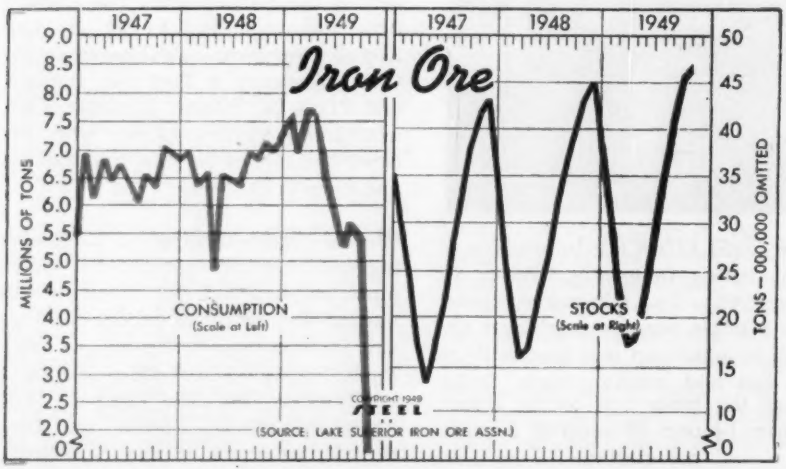
Federal Reserve Board's Production Indexes (1935-1939=100)

	Total Production		Iron, Steel		Nonferrous	
	1949	1948	1949	1948	1949	1948
Jan.	191	193	228	203	184	197
Feb.	189	194	232	203	186	197
Mar.	184	192	233	207	183	200
Apr.	179	188	219	177	168	198
May	174	191	204	206	145	196
June	169	192	177	208	132	194
July	162	186	156	201	128	185
Aug.	170	191	178	207	141	186
Sept.	174	191	179	214	157	192
Oct.	166	195	101	221	152	192
Nov.	...	195	...	223	...	187
Dec.	...	192	...	222	...	185
Ave.	...	192	...	208	...	193



Wholesale Commodity Price—Cost of Living Indexes

	Commodities (1926=100)			Living Cost (1935-1939=100)		
	1949	1948	1947	1949	1948	1947
Jan.	160.5	165.7	141.5	170.9	168.8	153.3
Feb.	158.1	160.8	144.5	169.0	167.5	153.2
Mar.	158.4	161.4	149.5	169.5	166.9	156.3
Apr.	156.9	162.7	147.7	169.7	169.3	156.2
May	155.7	164.2	147.1	169.2	170.5	156.0
June	154.4	166.4	148.0	169.6	171.7	157.1
July	153.4	168.7	150.8	168.5	173.7	158.4
Aug.	153.0	169.5	153.7	168.8	174.5	160.3
Sept.	153.7	168.7	157.4	169.6	174.5	163.8
Oct.	152.5	165.2	158.5	168.5	173.6	163.8
Nov.	....	164.0	159.6	....	172.2	164.9
Dec.	....	162.3	163.2	....	171.4	167.0
Ave.	....	164.9	151.8	....	171.2	159.2



Iron Ore

(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1949	1948	1949	1948
Jan.	7,590	7,057	31,904	29,081
Feb.	6,992	6,440	24,981	22,628
Mar.	7,735	6,634	17,308	16,022
Apr.	7,322	4,976	17,803	17,125
May	7,277	6,656	21,508	22,058
June	6,249	6,577	27,696	26,965
July	5,258	6,479	35,064	32,611
Aug.	5,711	7,036	40,811	37,081
Sept.	5,541	6,965	45,356	40,923
Oct.	877	7,273	47,017	43,883
Nov.	....	7,058	.....	45,160
Dec.	....	7,351	.....	39,460
Total	....	80,504		

The Business Trend

INDUSTRIAL production registered only a small gain in the week ended Nov. 26 as STEEL's industrial production index edged up to a preliminary 149 per cent of the 1936-1939 average from 147 in the preceding week. Strong upward pressure was exerted on the index by the climbing steelmaking rate but an offsetting factor was the lowest week's production by the automobile industry in almost two years.

STEEL—Output of steel for ingots and castings surged upward to 80 per cent of capacity in the week ended Nov. 26 from 56 per cent in the preceding week. Almost all of the nation's primary steel producers were back to work during the week. A further advance in the steelmaking rate is due in the current week to a rate slightly higher than the prestrike 85 per cent of capacity.

AUTOMOBILES—The holiday and a shortage of steel forced the assembly of passenger cars and trucks to the lowest point since the first week of January, 1948, in the week ended Nov. 26. Assemblies in the latest week reported totaled 74,946 units, compared with 115,152 in the preceding week and 89,482 in the like week a year ago. Introduction of new models by several builders will be hampered by their inability to make enough cars for adequate dealer sampling. Some of the companies will of necessity build only one model for early showing until improved steel supplies permit full-scale production of their entire line.

COAL—Bituminous coal production moved sharply upward to 14 million net tons in the week ended Nov. 19, the first full work-week since the start of the coal strike. This total not only topped the 7.1 million tons mined in the preceding week but also exceeded the 12,357,000 tons for like week in 1948.

PRODUCTION—Federal Reserve Board's seasonally adjusted industrial production index for October declined 4.6 per cent to 166 per cent of the 1935-1939 average from 174 per cent in September. The drop was less severe than the board had predicted while the coal and steel strikes were in full force. Iron and steel index dropped to 101 in October from 179 a month earlier. This index represents not only activity in the basic steel industry but various fabricating industries in the iron and steel group (see STEEL, Nov. 21, p. 73).

CARLOADINGS—Association of American Railroads says that from the standpoint of carloadings October was the worst month in the 30 years it has maintained carloadings records. The October total of 2,338,546 cars is more than one-third below the level for October, 1948, and nearly 8 per cent below the corresponding period in 1932, during the worst period of the depression.

BUSINESS—Business failures increased 10 per cent in October to 802 from 732 in September. Dun & Bradstreet reports that liabilities also rose slightly in October but remained considerably below the average monthly level for the first half of this year. October liabilities totaled about $23.9 million, bringing the ten-month total to $330.1 million.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	80.0	56.0	9.0	99.0
	Electric Power Distributed (million kilowatt hours)	5,537	5,644	5,433	5,349
	Bituminous Coal Production (daily av.—1000 tons)	2,333	1,183	423	2,059
	Petroleum Production (daily av.—1000 bbl)	5,192	5,211	5,075	5,666
	Construction Volume (ENR—Unit $1,000,000)	$90.2	$217.8	$135.8	$80.8
	Automobile and Truck Output (Ward's—number units)	74,946	115,152	137,651	89,482
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	720†	759	591	723
	Business Failures (Dun & Bradstreet, number)	148	183	221	101
	Money in Circulation (in millions of dollars)‡	$27,508	$27,397	$27,328	$28,305
	Department Store Sales (changes from like wk. a yr. ago)‡	−8%	−8%	−14%	−6%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,473	$12,928	$13,030	$14,484
	Federal Gross Debt (billions)	$256.9	$256.9	$256.6	$252.5
	Bond Volume, NYSE (millions)	$14.9	$20.6	$17.2	$13.3
	Stocks Sales, NYSE (thousands of shares)	5,706	7,420	7,706	4,570
	Loans and Investments (billions)†	$66.5	$66.7	$66.4	$62.6
	United States Gov't. Obligations Held (millions)†	$37,270	$37,042	$37,625	$33,525
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	164.8	169.3	168.9	232.6
	All Commodities†	151.5	151.4	152.5	164.2
	Metals and Metal Products†	169.2	169.4	169.0	173.7
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

ROBERT S. MILLER

Robert S. Miller has been elected executive vice president, general manager and a director of **Climax Machinery Co.**, Indianapolis, manufacturer of meat slicing machines, and a pioneer in manufacture of exhaust fans and air conditioning equipment. Mr. Miller was formerly southwestern regional manager of Ingersoll Steel Division, Borg-Warner Corp., in Dallas. Climax Machinery Co. has increased its facilities and is handling subcontract manufacturing of jet engines, aircraft equipment and component assemblies.

—o—

Stoody Co., Whittier, Calif., announces that **Paul Irish** has joined the firm as plant metallurgist to supervise production of its many hard-facing alloys, and also announces advancement of **Charles E. Rogers** to sales metallurgist. For the last three years Mr. Rogers has been in charge of the metallurgical laboratory.

—o—

Fred G. Baker has been appointed director of engineering and design, **Electro Chemical Supply & Engineering Co.**, Emmaus, Pa. Until recently he was a member of the engineering department of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

—o—

Edward H. Roos has been appointed factory manager, **C. A. Norgren Co.**, Denver. He has had 25 years of experience in production operations and factory management in the East. Mr. Roos has been associated with Wilson-Snyder Mfg. Co. and Oil Well Supply Co., subsidiary of U. S. Steel Corp. More recently he served as works manager of Imperial Division, Oil Well Supply Co., located at Oil City, Pa.

EDWIN A. BOOTH

Edwin A. Booth has been appointed general manager of sales, **Spang-Chalfant Division,** National Supply Co., Pittsburgh. He has been a member of the National Supply organization since 1929. He entered the metallurgical department of Spang-Chalfant, and two years later was transferred to sales. After sales department experience in Pittsburgh and St. Louis, Mr. Booth was appointed manager of the Tulsa, Okla., district in 1942, returning to Pittsburgh four years later in a similar capacity.

—o—

W. R. Caple has been appointed coordinator of branch activities for the magnesium sales department of **Dow Chemical Co.**, Midland, Mich. In his new capacity Mr. Caple, who has been in charge of magnesium sales in the Chicago office, will work out of Midland. He joined Dow Chemical as a metallurgist in 1931 and four years later became a member of the magnesium sales force. He has been in charge of magnesium sales at the Chicago branch office since 1939.

—o—

Soss Mfg. Co., Detroit, announces appointment of **John P. Dunphy,** 1039 Scott St., Covington, Ky., as a sales representative to cover Kentucky and Evansville, Ind.

—o—

William J. McQuillan has been promoted to branch manager, Pittsburgh office, **Morse Chain Co.**, division of Borg-Warner Corp., Chicago. Prior to joining the sales force of Morse Chain Co. in 1948, Mr. McQuillan was associated with the sales department of H. H. Robertson Co., Pittsburgh, and had formerly been with the engineering department of Blaw-Knox Co.

KENNETH H. HANNAN

Kenneth H. Hannan has been elected secretary of **Union Carbide & Carbon Corp.**, New York, succeeding **Morse G. Dial,** who has been elected a director. Mr. Hannan joined the legal staff of the corporation in 1936. He served in the U. S. Navy from 1941 through 1945, and returned to the finance department of Union Carbide in 1946. He has been assistant secretary and assistant treasurer of the corporation, and treasurer of the Electro Metallurgical Division, since 1948. Mr. Dial joined the corporation in 1929. He was successively sales manager and general manager, Pyrofax Division. In 1937 he became assistant secretary and treasurer, in 1945 secretary and treasurer, and since August, 1949, has served as a vice president of the corporation.

—o—

Marvin L. Katke, veteran automotive manufacturing executive, has been appointed plant manager of **Ford Motor Co.'s** projected automatic transmission plant at Cincinnati. The new unit will become a part of the company's general manufacturing division under **John Dykstra.** Mr. Katke began his association with the automotive industry in 1928 when he joined the Oldsmobile Division of General Motors. His last post before joining Ford was superintendent of the engine plant at Lansing, Mich.

—o—

Continental Screw Co., New Bedford, Mass., announces three changes in its sales force: **Leonard A. Ashworth,** who formerly covered the New York metropolitan area, will represent the company in Maine, New Hampshire, Vermont and Connecticut; **Robert A. McCormick** leaves the office staff to take over the New York metropolitan

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area; and **Paul R. Flemming,** a Continental representative, will cover the state of New York and a portion of Pennsylvania.

—o—

Harry C. Gross has been appointed chief chemist and metallurgist by **Tungsten Alloy Mfg. Co. Inc.,** Newark, N. J. The company has expanded operations with acquisition of G. & O. Laboratories, which specializes in metallurgical analysis of powdered metals, formerly owned and operated by Mr. Gross. He will be assisted by **Stuart Tarkan.** Prior to setting up his own laboratories, Mr. Gross was with Westinghouse Lamp Co., Callite Tungsten Corp. and Sirian Wire & Contact Co.

—o—

Hilding Carlson has been appointed advertising and sales promotion manager, **Selas Corp. of America,** Philadelphia. Formerly managing editor of Dodge Reports Press Service, he recently was an associate in the firm of E. Holley Poe & Associates, New York.

—o—

Clifford A. Hampel has been named supervisor of extraction metallurgy at **Armour Research Foundation** of Illinois Institute of Technology. He formerly headed the inorganic technology program of the ceramics and minerals department.

—o—

Joseph B. Dietz has been appointed manager of industrial sales section, finishes division, **E. I. du Pont de Nemours & Co. Inc.,** Wilmington, Del. He has been assistant industrial sales manager since 1945. Mr. Dietz succeeds **Henry E. Lackey,** retiring after 43 years' association with the company. Other changes in the finishes division are: **William P. Fisher Jr.,** since 1947 industrial sales manager in the Chicago region, appointed assistant manager of industrial sales at Wilmington; **William E. Kreuer,** since 1947 industrial sales manager in the Cleveland region, transferred to Chicago in the same capacity; **Richard N. Sanger,** since 1946 industrial technical supervisor at Cleveland, appointed industrial sales manager at Cleveland; and **Walter S. Woods II,** an industrial salesman in the Chicago region since 1939, appointed industrial sales supervisor at Cleveland.

—o—

Ruud Mfg. Co., Pittsburgh, manufacturer of gas water heaters, announces election to the board of **A. B. Cameron,** vice president and general manager of the company, and **J. T. Ryan Jr.,** executive vice president of Mine Safety Appliances Co.

E. E. Ames, a veteran of **General Box Co.,** Chicago, who before his retirement in 1947 served as vice president and director of sales, has been elected chairman of the board. **W. C. Embry,** vice president in charge of the Louisville plant, was elected a director to fill the position occupied by his father, the late **Harry W. Embry. J. F. Ferguson,** vice president and sales manager, was also elected a director. Both Mr. Embry and Mr. Ferguson will retain their old duties in addition to their new responsibilities.

—o—

D. S. MacDonald has been appointed assistant to the manager of gear motor sales division, small & medium motor divisions, **General Electric Co.,** Schenectady, N. Y. He formerly was a motor control specialist in the company's apparatus department, Baltimore office. **Nicholas A. Massello** has been appointed acting production head of the freezer section, refrigerator division, Erie, Pa., works. **F. B. Law** has been appointed manager of manufacturing, aeronautic and ordnance systems divisions at Schenectady. He succeeds **Frank T. Lewis,** named manager of manufacturing, small apparatus divisions. Mr. Law has been assistant to the manager of manufacturing for the divisions since July.

—o—

P. R. Lyons, district manager of Ohio, **Hanson-Van Winkle-Munning Co.,** Matawan, N. J., has been appointed manager of electrical sales, with headquarters in Matawan, and **Martvig J. Moll** has been appointed manager of conveyor sales. **Irving A. Gemmell** has been named assistant manager of conveyor sales; **Wilfred G. Cryderman,** covering the southern Ohio territory, has been transferred to the Cleveland office; and **Gordon Lyons** has been appointed sales representative in Dayton, O.

Raymond C. Randall has been appointed vice president for operations and maintenance of the **Erie Railroad,** Cleveland. Four other changes announced are: **Milton G. McInnes,** eastern district general manager at Jersey City, N. J., transferred to Cleveland as assistant vice president; **Garret C. White** succeeds Mr. McInnes as general manager at Jersey City; **Elmer J. Stubbs** was appointed general superintendent of transportation and **H. Hale Clark** as superintendent of transportation.

—o—

Herbert DuVal Jr., for many years with General Electric Co., has joined **Airborne Instruments Laboratory,** Mineola, N. Y., as technical assistant to **H. R. Skifter,** president. Mr. DuVal was with General Electric for 14 years, during which time he became head of the company's naval electronics commercial activities.

—o—

Milton L. Huemme has been appointed manager of coke sales, **Diamond Alkali Co.,** Cleveland. He succeeds the late **Benjamin F. Lambert.** He first joined the company's coke sales office in Cleveland in 1936 as a sales and service representative. From 1923 to 1927 he was associated with the Pittsburgh offices of the Texas Co., Pennsylvania Railroad, and Equipment Corp. of America in various administrative capacities. During World War II he served with the Ordnance Branch of the U. S. Army, and rejoined Diamond's coke sales office in Cleveland in 1945.

—o—

Robert D. Hill has been appointed treasurer of **Taylor-Wharton Iron & Steel Co.,** Cincinnati, and **J. G. Kreis** as vice president of purchases. Mr. Hill was formerly with Noma Electric Corp. and Union Switch & Signal Co., and Mr. Kreis has been with Weir Kilby Corp. for 35 years. The new

P. R. LYONS

MARTVIG J. MOLL

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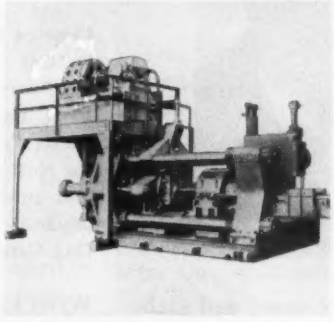

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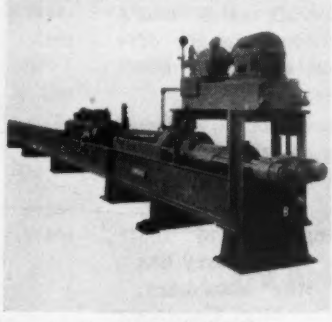

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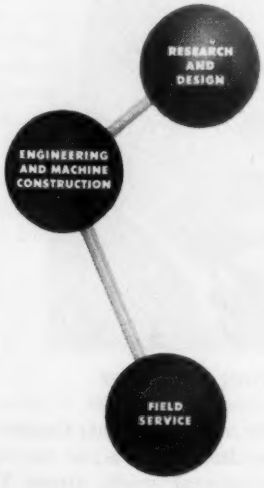

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appointment of Mr. Kreis is in addition to his responsibilities as purchasing agent of Weir Kilby Corp.

—o—

Earl W. Pughe has joined **Wheland**

EARL W. PUGHE

Co., Chattanooga, Tenn., as manager, manufacturing division. He has more than 30 years' experience as a production executive. He was with Chevrolet Division of General Motors Corp. for 22 years, and has been, prior to his connection with Wheland, assistant to the president, Dana Corp., Toledo, O.

—o—

John L. Lennon has been appointed manager, scrap purchasing department, **American Metal Co. Ltd.**, New York, succeeding the late **James Mac Nee Jr.** Mr. Lennon has been with the company for 20 years.

—o—

Leo L. Rosshirt, former assistant resident manager at the Kansas City plant of Fisher Body Division, **General Motors Corp.**, has been promoted to resident manager to succeed **H. D. Burnside**, appointed manager of the Wilmington, Del., plant of the Buick-Oldsmobile-Pontiac assembly division. **Harry L. Emerson,** former resident director of industrial relations at the Kansas City plant, will assume the assistant resident managership. In his new position, Mr. Burnside succeeds **Robert Ahlers,** who has been granted a leave of absence.

—o—

Ralph M. Whitaker has been appointed Ohio district sales manager for the line of Glenny pushbroaches of **Kase Machine Co.**, Cleveland. He joined the company in mid-1949 and has directed sales efforts in the Ohio territory since that time.

—o—

Arthur J. Renz has been named field engineer on precision spindle applications for **Pope Machinery Corp.**, Haverhill, Mass. He formerly was with the tool and die department of General Electric Co.

—o—

Dudley W. Figgis, former president, **American Can Co.**, New York, and now chairman of its board, has been elected a vice chairman of the board of trustees of Stevens Institute of Technology, Hoboken, N. J.

—o—

A. A. Johnson has been appointed manager of central station engineering in the industry engineering department of **Westinghouse Electric Corp.**, Pittsburgh. He succeeds **Dr. Charles F. Wagner,** named consulting engineer for the company. In his new position Mr. Johnson will co-ordinate engineering activities of the company on problems of generation, transmission, distribution and system protection for electrical utilities and large industrial plants.

—o—

Stuart Smith has been appointed

STUART SMITH

product manager of sheet and plate sales for **Reynolds Metals Co.**, and will have headquarters in Louisville. He has been serving in Dayton, O., as manager of aircraft sales, and previously was division manager of the New York office, aluminum mill products division.

—o—

Champ Carry has been elected president and chief executive officer, **Pullman Inc.**, Chicago, and **Morris W. Kellogg** elected chairman of the board, effective Jan. 1. Mr. Carry has been president of the subsidiary, Pullman-Standard Car Mfg. Co. As president of Pullman Inc., he succeeds **David A. Crawford,** who continues as a director. Mr. Kellogg has been chairman of M. W. Kellogg Co., which is another Pullman subsidiary.

—o—

Fred W. Marschner, administrative assistant to general manager, **Milton L. Gearing, New Departure Division**, General Motors Corp., Bristol, Conn., has retired after 35 years' service with the firm. He has held the above position with Mr. Gearing since May, 1947, and previously was western sales manager for the division in Detroit for 33 years.

—o—

T. L. Harrison, partner in the law firm of Hardy, Stancliffe & Hardy, has been elected a director of **Shippers' Car Line Corp.**, subsidiary of American Car & Foundry Co., New York.

—o—

Charles A. Lambert, manager of the Hattiesburg, Miss., naval stores plant, **Hercules Powder Co.**, will retire Dec. 31. **L. Coleman Hall,** formerly plant superintendent, will succeed Mr. Lambert as plant manager.

—o—

Mathews Dick Jr. has been appointed sales engineer in the Chicago area by Butterfield Division, **Union Twist Drill Co.**, Derby Line, Vt. After serving with the U. S. Navy from 1943 to 1946, Mr. Dick joined International Harvester Co., where he first worked in the manufacturing research division, and was later assigned to the machine shop and time study department.

—o—

Charles S. Glenn has been appointed Detroit district manager for **Copperweld Steel Co.**, Warren, O., succeeding **Fred Lawrence.** For 13 years Mr. Glenn was assistant sales manager for Rotary Electric Steel Co., Detroit, and prior to that served in a sales capacity for Timken Steel & Tube Co., Canton, O.

—o—

Wynn F. Rossiter has been elected as-

WYNN F. ROSSITER

sistant to the vice president, **Carpenter Steel Co.**, Reading, Pa., to devote his time to special work. **Omar V. Greene** succeeds Mr. Rossiter as New

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England sales manager with headquarters in Hartford, Conn., and **John W. Thompson,** manager of alloy steel sales, has been named manager of sales development to succeed Mr. Greene in this capacity at the company's main office in Reading.

—o—

John M. Gilbreth has joined the New York staff of **McKinsey & Co.,** management consultant.

—o—

Edward C. Bailey, long affiliated with **Greenfield Tap & Die Corp.,** has opened offices at 53 Park Place, New York, as a manufacturers' representative.

—o—

Standard Transformer Co., Warren, O., announces appointment of **F. L. West,** 106 Temple St., Avon, N. Y., as its representative for western New York.

FRED C. HALL

Fred C. Hall has been appointed director of sales, **American Coach & Body Co.,** Cleveland, succeeding **Clarence G. Wood.** Mr. Hall has been associated with the company since 1936, representing the company in the western half of the United States. In 1946 he was chosen to open the new California division at Oakland, and as general manager, he has been executive officer of the division. He will make his headquarters in Cleveland in his new position.

—o—

William H. Hoover has been elected president of **Anaconda Copper Mining Co.,** New York. He succeeds the late **James R. Hobbins. Clyde E. Weed,** vice president in charge of mining operations, was elected a director of the company. Mr. Hoover has been vice president and general counsel of Anaconda since 1943 and director since 1947. His association with the company began in 1914 as associate counsel for the plant at Great Falls, Mont.

OBITUARIES...

Joseph Ledwinka, 79, former chief engineer, **Budd Co.,** Philadelphia, died Nov. 26. He was well known for his work in the field of automotive design and electricity. He joined the Budd Co. in 1912, and was chief engineer of the company until his retirement seven years ago. He had been consulting engineer in the concern's automotive division since that time.

—o—

Fred W. Beyer, general superintendent, **Indianapolis Drop Forging Co.,** Indianapolis, and associated with the company since 1901, died Nov. 19.

—o—

Albert W. Bissell, 58, vice president, secretary and treasurer, **Neff, Kohlbusch & Bissell Inc.,** Chicago, died Nov. 16 at his home in Evanston, Ill.

—o—

John Bos Jr., 49, president, **Bos-Hatten Inc.,** Buffalo, structural steel products, died Nov. 22 after a brief illness. He had been president of the company since the death of his father, John Bos Sr., in 1940.

—o—

James J. Collins, 83, retired sales manager, **G. F. Wright Steel & Wire Co.,** Chicago, died Nov. 24.

—o—

Charles H. Walther, retired operator of **Walther Foundry Co.,** Coxsackie, N. Y., died Nov. 21.

—o—

Francis J. Hood, 44, president, **Ansul Chemical Co.,** Marinette, Wis., died Nov. 10 while on a business trip in New York. He was elected to the presidency of the company less than a year and a half ago. Before that he had served as vice president, secretary-treasurer and, originally, California representative.

—o—

Albert A. Criqui, 67, consulting engineer for **Buffalo Forge Co.,** Buffalo, died Nov. 7. His entire engineering career was spent with the Buffalo Forge Co.

—o—

Vernet Nielsen, Pacific Northwest industrialist and vice president and general manager of the northern division for **Gladding, McBean & Co.,** died Nov. 8.

—o—

Fred R. Klaus, 75, founder and vice president-general manager, **United Mfg. Co.,** axle maker, Bedford, O., died Nov. 24.

—o—

Albert L. Summers, 64, manager of the procurement division, **United Engineering & Foundry Co.,** Pittsburgh, and associated with the company 48 years, died Nov. 17.

—o—

Patrick J. McCartin Jr., 45, New York sales manager, **General Tire & Rubber Co.,** died Nov. 28.

Harry D. Houck, 48, owner, **Welding Metals Mfg. Co.,** Detroit, died at his home in that city Nov. 27 as the result of burns.

—o—

Jesse E. Dowley, 65, president and general manager, **Cal-Van Machine Products Inc.,** Jackson, Mich., died Nov. 9 of a heart attack. He was an early pioneer in the automotive parts field. In 1920 he organized the National Machine & Tool Co., Jackson, and became known as one of the foremost suppliers of mechanics hand tools, under the name "National." He sold the latter company in 1941, and the same year organized Cal-Van Machine Products Inc., manufacturer of automotive parts and garage tools.

—o—

William F. Campbell, 58, vice president, **McKiernan-Terry Corp.,** New York, died Nov. 19 of a heart attack. He also was secretary of Campbell Foundry Co., Harrison, N. J.

—o—

Alexander Nimick Sr., 62, works manager, Colonial Steel Division, **Vanadium-Alloys Steel Co.,** Monaca, Pa., died Nov. 23. He had been in the steel business for more than 40 years.

—o—

Russell A. Peterson, 45, sales manager for **Davis Regulator Co.,** Chicago, died Nov. 20.

—o—

William P. Andrews, 48, who, because of ill health, retired last January as assistant sales manager, **Nottingham Steel Co.,** Cleveland, died Nov. 27.

—o—

Joseph W. Epstein, for the last 20 years vice president, **Cohen Iron & Metal Co.,** Milwaukee, died Nov. 23.

We Apologize

This magazine was in error last week in reporting that Charles A. Brauchler had died (STEEL, Nov. 28, p. 53). The editors deeply regret the inconvenience and embarrassment to Mr. Brauchler, his family and friends. Mr. Brauchler is president and general manager, Canton Drop Forging & Mfg. Co., Canton, O.

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Production AND Engineering
NEWS AT A GLANCE

PAPER SHUFFLING REVOLUTION— Coming electronic devices and techniques show promise of reducing distribution costs just as power-driven machinery curtailed production costs, according to Arthur D. Little Inc., Cambridge, Mass. The company points out that today 8 million individuals in the country are employed chiefly in keeping track of producers' and salesmen's activities. If all this repetitive clerical work involving customers' accounts, inventories, payrolls, tax deductions and statistics could be done by machines, the result would be comparable to the advantage of machine tools over hand labor production.

DETERMINES SHEET ELONGATION— An improved photo-grid technique for determining elongation of sheet metal, developed by the National Bureau of Standards, Washington, is reported to overcome difficulties involved in other methods and to provide a more reliable procedure for establishing the behavior of sheet metal during forming. Method also is proving useful for investigating plastic deformation in the vicinity of holes, and in studies of other structural discontinuities which result in excessive stresses.

REDUCES MACHINING OVERHEAD— Axle shift forks which are an important part of the 2-speed truck axles manufactured by Axle Division of Eaton Mfg. Co., Cleveland, are now turned out at the rate of 87 pieces per hour at 100 per cent efficiency on a special machine delivered to the plant by Cross Co., Detroit. The machine, which requires attention of only one unskilled operator, performs 12 different operations on the work. Four stations are involved in the processing.

HARNESSES WASTE HEAT—Usually wasted exhaust heat from the engine is employed in a fuel vaporizer developed by Black, Sivalls & Bryson Inc., Kansas City, Mo., to generate fuel gas from crude oil for use in gas engines. Actually a miniature topping plant, the unit heats crude oil sufficiently to vaporize its lighter hydrocarbons—propane, benzene, naphtha and gasoline. Development is especially handy in regions where natural gas is scarce or expensive.

CUTS DOWN WEIGHT— Light weight alloys are used in a grader currently being tested at Port Hueneme, Calif., for the Navy Bureau of Yards and Docks. Light enough to travel by air, the earth mover is capable of doing any job standard models can perform, according to the Department of Defense, Washington. The machine weighs about 3 tons less than normal graders and is fitted for ballast boxes if more weight is required to hold it down.

CONVEYORIZED OPERATOR— Use of rolling chairs is increasing production by about 25 per cent in a small parts machining department of Binks Mfg. Co., Chicago. The chairs, which glide operators from one machine to another during repetitive drilling, reaming and tapping operations, not only simplify operator movement but also overcome fatigue. Consisting of a 4-wheeled wooden seat that rolls along a track on a wooden bench paralleling the worktable, each chair keeps the operator at a comfortable working height in relation to the bench-mounted machines. Continuity of operations is further facilitated by a 6-sided open fixture which allows operator to turn a part to any side or angle along the bench for machining.

OVERLOOKED FACTOR—Although corrosion-resistant metals cost several times as much per pound as plain carbon steel, and some precautions are in order to get the most for the least investment, it still is of prime importance to select the most suitable material for all conditions. The latter point especially is frequently overlooked by designers of equipment in their zeal to keep costs low. It is pointed out that it pays dividends to select materials for reducing corrosion rather than fabricating costs. (p. 92)

RESULT OF KNOWLEDGE—Realization that different combinations of alloying elements employed in commercial aluminum produce a variety of metallurgical structures, plus effectiveness of cleaning and conditioning treatments, are mainly responsible for improvements in the zinc-immersion technique for plating aluminum alloys. Of all the methods developed for this work, the zinc-immersion procedure is reported to be the most generally satisfactory and practical for use in plating on aluminum alloys. (p. 94)

RIGID CONTROL—If dimensions of a component of any of the bearings processed by Federal Bearings Co. are found to be outside tolerances, the entire batch is segregated and inspected 100 per cent. Rigid control pattern followed by the company starts with the machine operator who continuously spot checks parts, employing as many as six or eight dial indicator gages mounted on a nearby table. (p. 98)

IRON ORE SHORTAGE?—There is no shortage of ore in the Western hemisphere, according to E. W. Davis, director, Mines Experiment Station, University of Minnesota, Minneapolis. The big question is how can it be procured for our use most economically from the several sources. To provide an adequate future, iron ore supply for this nation will require great investments of new capital, he points out. Already careful studies are being made on where and how this capital can best be invested. Decisions must be made soon—some of them certainly within the next 5 years. (p. 122)

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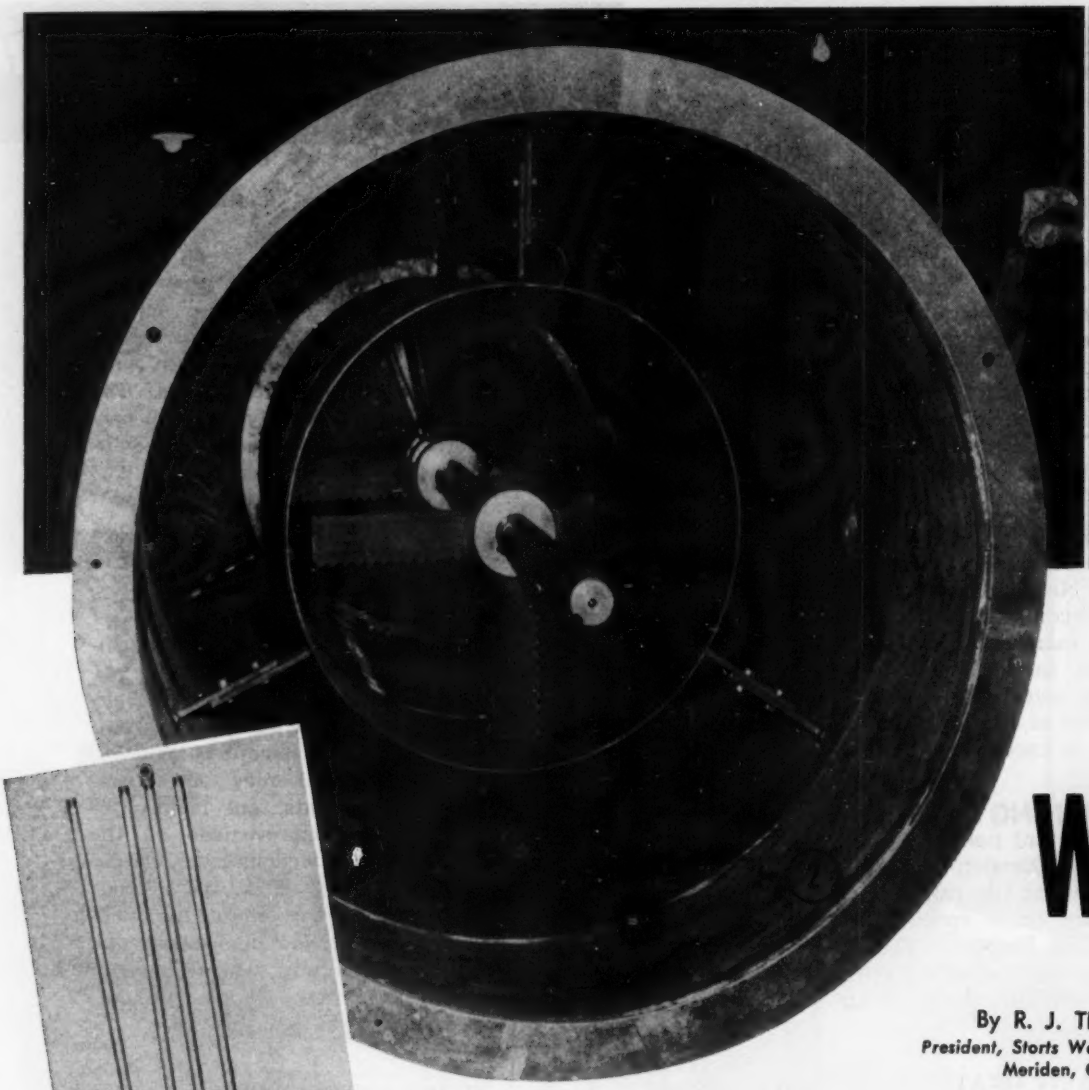
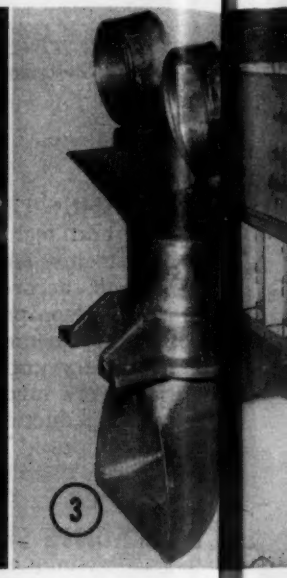
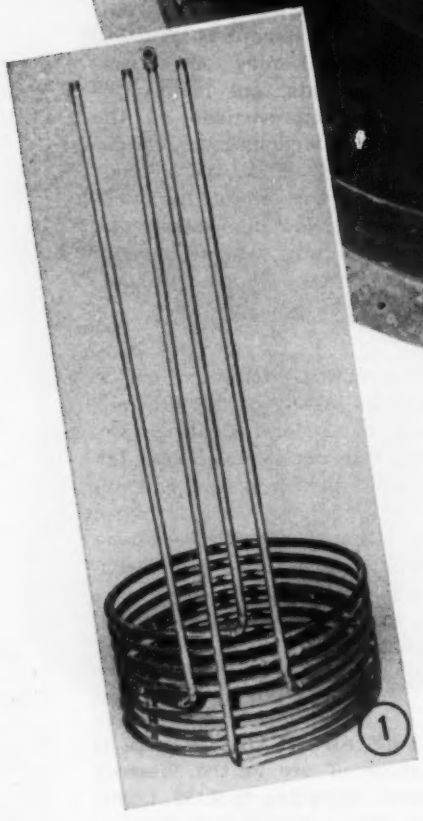






Welded Fa

By R. J. TIERNEY
President, Storts Welding Co. Inc.
Meriden, Conn.

Fig. 1—Nesting arrangement of hot water and cooling water coils for stainless steel dyeing tank

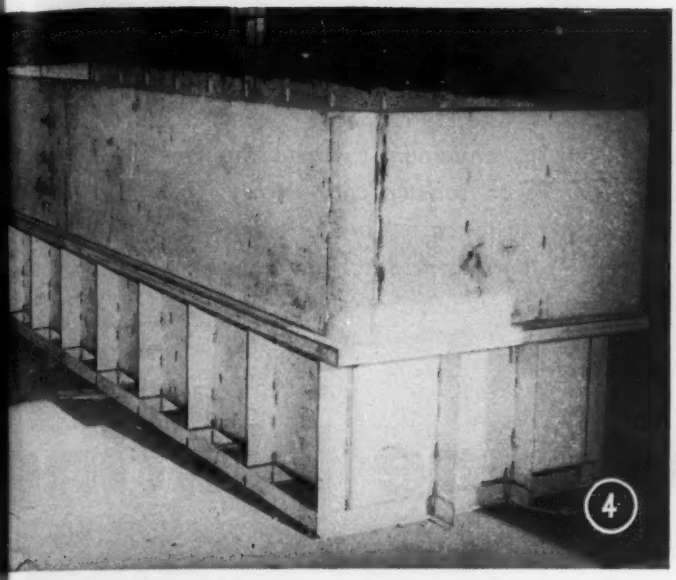
Fig. 2—Large mixing tank

Fig. 3—Lead chamber in which impeller is suspended

Fig. 4—Stainless steel tank for metal processing in which a highly corrosive solution is used

PRODUCTION managers in many large metal manufacturing and fabricating plants today would be at a loss to obtain suitable equipment for their operations if welding engineers had not developed procedures for welding semiprecious metals. This is a convenient term for classifying the corrosion-resistant materials such as stainless steel, nickel, Monel, Inconel, copper and aluminum alloys and the clad steels. Altogether it applies to a large number of alloys, each of them capable of withstanding the attack of a wide range of corrosive agents. The fact that all these semiprecious metals can be welded makes it possible to fabricate practically any kind of industrial equipment and expect it to last indefinitely under conditions that would cause extremely rapid deterioration of the same equipment if it were made of plain carbon steel.

Precautions To Be Taken—One common characteristic of all these corrosion-resistant materials is that they all cost several times as much per pound as plain carbon steel. Consequently a few precautions must be taken, in order to get the most for the least investment without sacrificing serviceability and long life. Obviously, it is of prime importance to select the most suitable material for the conditions. Yet, this is frequently overlooked by designers in their zeal to keep costs low.



ed Fabrications

. . . in corrosion-resistant materials give engineers great latitude in design of industrial equipment

The experienced fabricator knows, for example, that stabilized stainless steel is wholly dependable for welded construction of equipment or parts designed to operate under conditions where unstabilized stainless might not stand up much longer than plain carbon steel. In other words, it pays to select materials with the purpose of reducing corrosion costs rather than reducing fabricating costs. The saving in corrosion cost can be far greater.

Another point is that overdesign can add materially to the cost. With plain carbon steel there may be good economy in using extra thickness to assure rigidity. With more expensive materials it may be better to use lighter gages and add stiffening ribs where they will do the most good. Cost per pound is only one of the factors to consider in designing, or in comparing costs with plain carbon steel construction. Other factors are: Comparative strength of the material, cutting cost, forming cost, welding and finishing cost. Whenever use of a corrosion-resistant alloy eliminates the need for a protective coating it also eliminates the cost of maintaining such coating.

Good Weldmanship Important—Good weldmanship also rates high as an influence on the ultimate cost. On some of these materials special techniques are necessary to preserve the corrosion-resistant properties, and it must be remembered that it takes only a thin line of corrosion to defeat the purpose of using any semiprecious metal. Also, such defects as undercuts and porosities, which only mildly affect the strength of the fabrication, invite corrosion in much the same degree as notches are the cause of stress concentrations. When inspection reveals any kind of crevices, pockets or porosities, there is costly chipping out and rewelding to do. Good results are dependent upon having operators who know the characteristics of the different materials and what the pitfalls are in welding them.

Some of the semiprecious metal fabrications shown here will illustrate the great variety of equipment that has been turned out by Storts Welding Co. in recent months. Round and rectilinear plain tanks constitute the most common application. They are formed from simple elements and conventional welding techniques are used throughout. Yet even in these comparatively simple fabrications, welding quality is closely checked, especially in corners where crevices are most difficult to avoid. It is not enough that welds be full strength and leakproof—they must also be corrosionproof.

Tank Seams Double Welded—The stainless steel tank shown in Fig. 4 was made for metal processing in which a highly corrosive solution is used. It is 23 feet long, 56 inches wide and 72 inches deep and made of 10-gage type 347 stainless. All tank seams are double welded; that is, welded from both sides. For the stiffening ribs on the four sides and bottom, widely spaced intermittent welds are sufficient, and avoid excessive distortion.

Flat stainless bars were similarly welded to all four inside walls and across the bottom to take up the wear incident to moving materials in and out of the tank. This is one of three tanks which make up a complete processing unit when installed side by side. They are identical except that the first and third tanks have the outside corners rounded and the middle tank has aprons only at the ends. After installation these tanks were welded together at all abutting edges.

A large stainless steel tank used for dyeing is another product of the company. Accessory items are: A stainless steel shelf, brackets, baffles, heating and cooling coils, dished bottom with drain outlet and coarse wire mesh cover. When in operation, the temperature of the dye solution is controlled by a hot water coil and a cooling water coil. The nesting arrangement of these coils and the use of stainless steel welding pipe fittings are shown in Fig. 1. As accessories for various types of processing tanks, Storts has fabricated thousands of coils for heating, cooling, rinsing, etc., in all conceivable shapes, and utilizing all metals and alloys that are available in pipe or tube form.

Unusual Corrosion Problem—An unusual corrosion problem was presented in the large mixing tank shown in Fig. 2. Major portion of the tank shell, the inside tank and the agitator blades are all plain carbon steel. Previous experience of the customer had demonstrated that the mixture itself was not corrosive but that vapors rose (*Please turn to Page* 130)

Practical methods are available for electroplating aluminum to meet the demand for articles with more eye appeal, improved surface conductivity, reduced friction, or better wear and corrosion resistance. More effective cleaning and conditioning treatments have resulted in widespread commercial use of the zinc-immersion process

Production-Line Plating

RECENT developments in electroplating on aluminum have resulted in methods that are commercially practical and economically sound. To furnish eye appeal, plated finishes are being considered for many different articles made from various aluminum alloys. The electroplates usually applied for finish and other purposes are chromium, nickel, copper, brass, silver, gold, and oxidized modifications of these. Silver is applied to electrical equipment to decrease contact resistance or to improve surface conductivity; brass to facilitate vulcanization of rubber to aluminum; copper for assembly by soft soldering; chromium to reduce friction and obtain increased resistance to wear; zinc for threaded parts where organic lubricants are not permissible, while tin is frequently employed to reduce friction on bearing surfaces.[1]

When the protection of aluminum against salt-fog corrosion is of paramount importance, cadmium plating has been recommended, since the cell potential between cadmium and aluminum is very low.[2] Fig. 1 shows typical aluminum parts plated with the conventional copper-nickel-chromium bright finish.

During the last 25 years a number of different methods were developed and promoted for preparing aluminum alloys for plating. Some of these, however, are too complicated for practical use; others are limited in their application to certain alloys or are uneconomical for general use. Of the various methods developed, the zinc-immersion procedure is reported to be the most generally satisfactory and practical for use in plating on aluminum alloys.[3] Improvements in the zinc-immersion procedure that have resulted in widespread commercial use of the process have been mainly in the effectiveness of the cleaning and conditioning treatments used for the various aluminum alloys. This resulted from the realization that the different combinations of alloying elements used in commercial aluminum produce a variety of metallurgical structures that may respond differently to chemical and electrochemical treatments.[4]

Conditioning Aluminum Surfaces — Cleaning and conditioning treatments to give satisfactory results on aluminum must satisfy three basic requirements, namely: (1) Remove oil, grease, dirt and other surface contaminants and leave a surface that will be uniformly responsive to treatments to dissolve the surface oxide film; (2) remove the natural oxide film and replace it with a thinner, more uniform, and suitable film; and (3) remove certain microconstituents which may interfere with formation of a uniform immersion deposit and may subsequently react with the solutions used in plating.

In cleaning, when much oil or grease is present, either vapor degreasing or solvent cleaning may be necessary. Ordinarily, a mild alkaline cleaner can be used. Such a cleaner should be of the type suitable for use with aluminum, and a number of suitable commercial cleaners are available. A suitable cleaner of this general type, can be made by using 3 per cent each of sodium carbonate and sodium phosphate. This solution is generally used at a temperature of 140 to 180° F, for 1 to 3 minutes. However, it is particularly important to preclean when bright finishes are to be plated.

Etch and Nonetch Cleaners—It has been brought out[5] that alkali cleaners for aluminum are of two types, etching and nonetching. Etching type cleaners work rapidly and are very effective, but they cause a smut to form that is frequently difficult to remove. Nonetching cleaners are much poorer cleaners than etching cleaners and nonetching cleaners may also leave films (usually silicious) that can be troublesome. Cleaning of aluminum and its alloys to produce a smut-free bright surface is made difficult because of the high chemical activity of aluminum and because of the many alloying elements and impurities usually present. This chemical activity assists cleaning when etched surfaces can be tolerated but it limits the type and efficiency of alkali cleaners that must perform without etching.

Nonetch cleaners usually contain alkalis such as sodium carbonate, trisodium phosphate, complex phosphates, sodium hydroxide, sodium metasilicate, wetting agents, together with an inhibitor to prevent attack on the aluminum. The inhibitors may reduce the overall cleaning efficiency; therefore, if very oily work must be cleaned without etching, a satisfactory precleaning method for oil removal must be used before the nonetch cleaner.

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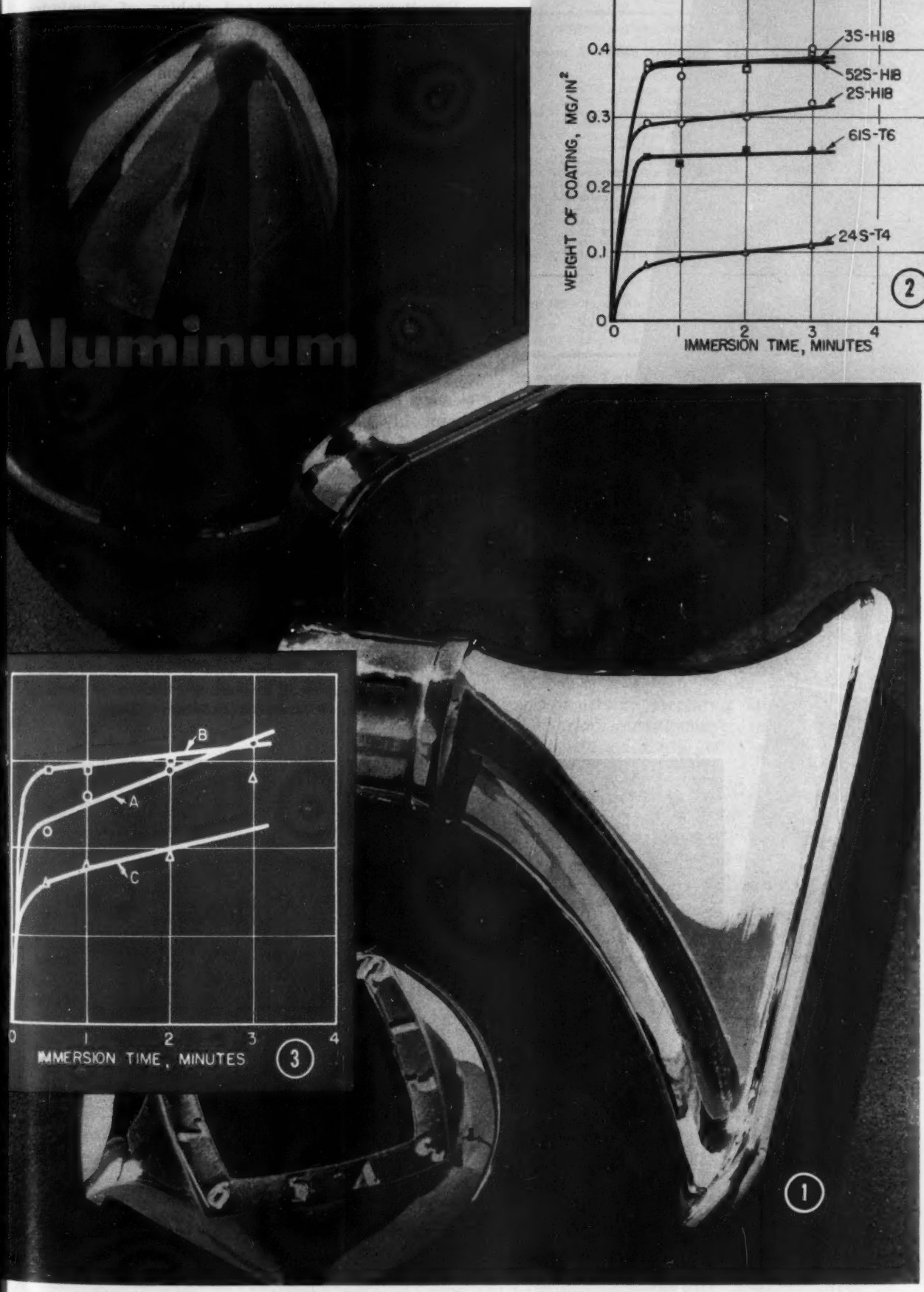


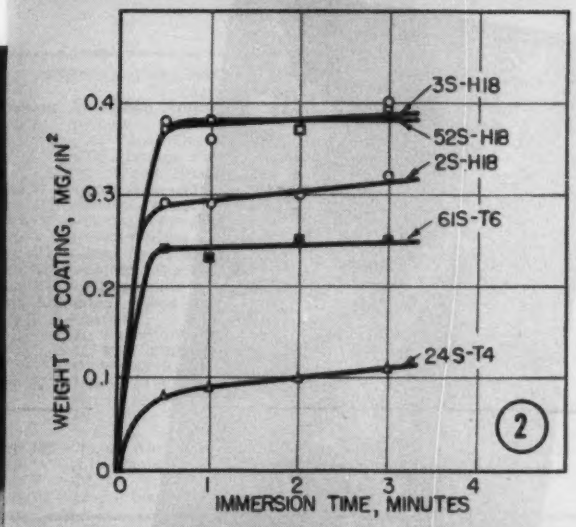
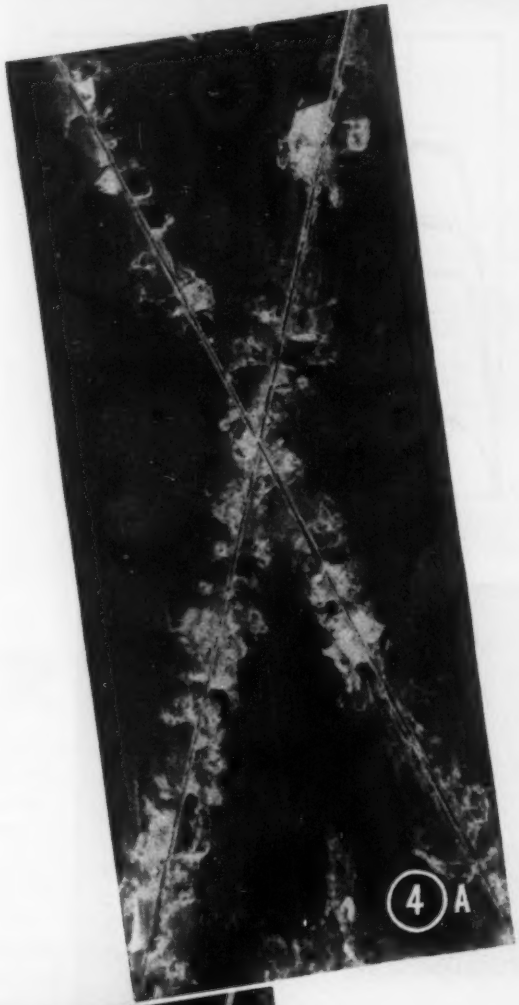
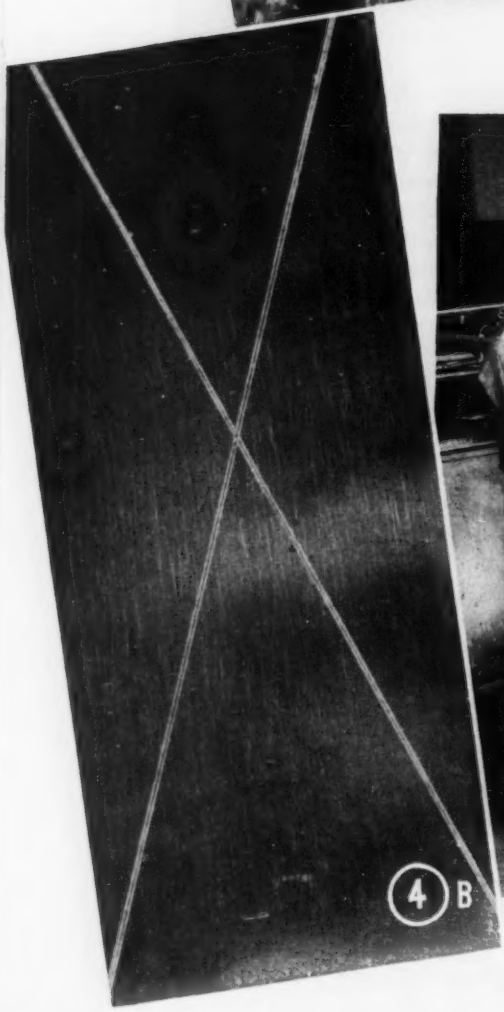


Fig. 1—Typical aluminum parts plated with copper-nickel-chromium bright nontarnishable finish. Courtesy Aluminum Co. of America

Fig. 2—Weight of zinc-immersion deposit on various wrought aluminum alloys with different immersion periods

Fig. 3—Effect of various conditioning treatments on weight of zinc-immersion deposit. Treatment (A) carbonate-phosphate cleaner plus zinc dip; (B) same cleaner plus 25 per cent sulphuric acid etch plus zinc dip; (C) same cleaner plus double zinc dip





Simultaneous cleaning and etching of aluminum can be done with many alkalis, particularly sodium carbonate, trisodium phosphate, and sodium hydroxide. Concentrations used range from 1 to 16 ounces per gallon and temperatures from 150° F to the boiling point. The evolution of hydrogen assists the cleaning action greatly. Silicate compositions are also used for etch cleaning. It is important that work coated with heavy oil films be precleaned to prevent the formation of an etched pattern due to a nonuniform rate of removal of the oil by the etch cleaner. Frequently oil released from crevices or holes will cause spots or streaks during etch cleaning. Smut forms on the aluminum to variable degrees depending on the amount of aluminum dissolved and the alloy treated. This smut must be removed by means of an acid dip.

Acid Dipping — When a nonetching aluminum cleaner is used, the work should be rinsed very thoroughly. It has been recommended[5] that any traces of adsorbed silica be removed by a 5-10 second dip in a 2-3 per cent by volume solution of hydrofluoric acid maintained at room temperature. This

Fig. 4—These grooved copper-nickel-chromium plated aluminum panels illustrate one type of test used to determine how various plating procedures may affect the quality and serviceability in both atmosphere and salt spray corrosion Both samples were exposed to 300 hours salt spray. Nickel plate in sample A was hard and stressed and developed stress corrosion cracks early in test; sample B was plated with a soft ductile nickel and showed only a small amount of corrosion at grooves. Aluminum Research Laboratory tests

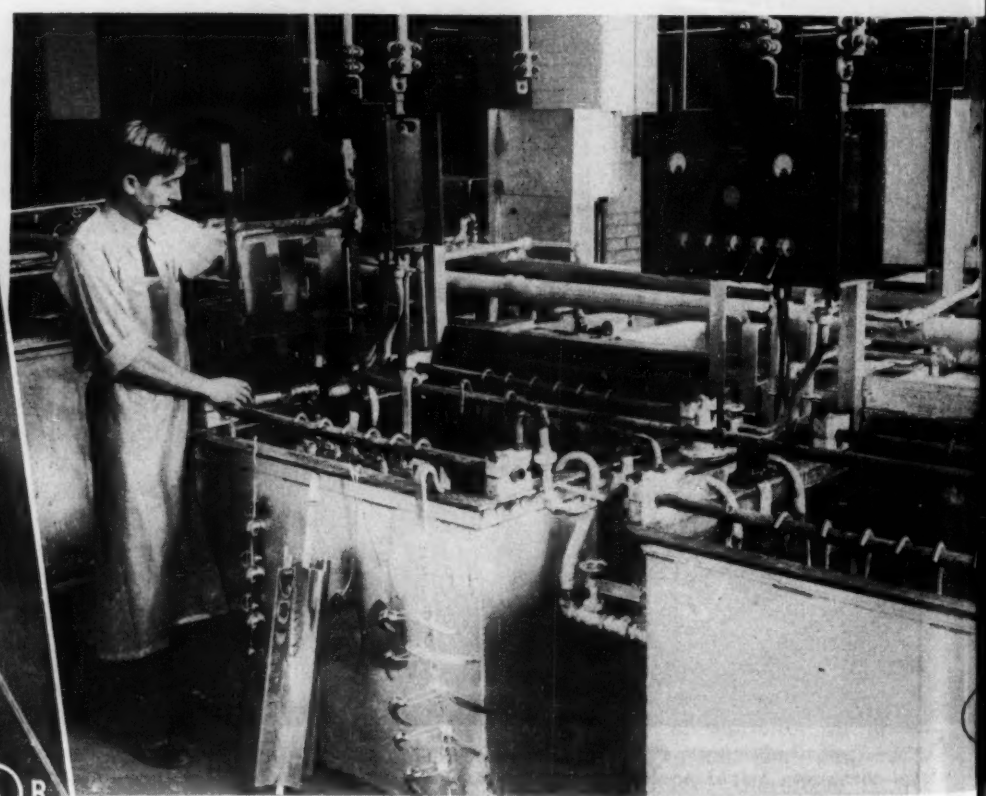


Fig. 5—Plating room setup for handling aluminum parts. Courtesy Aluminum Co. of America

acid can be made by adding 4-6 gallons of commercial 48-52 per cent acid to 94-96 gallons of water.

If an etching type aluminum cleaner is used, the smut must be removed by means of a nitric acid dip if the alloy contains copper, and a nitric-hydrofluoric acid dip if it contains silicon with or without copper. Composition of the two types of acid dips recommended for production use are as follows:

Nitric Acid Dip

Nitric acid, 36°Be	2 gal
Water	1 gal
Operate	at room temperature
Dipping time	about 10 seconds; longer at lower temperatures

Nitric-Hydrofluoric Acid Dip

Nitric acid, Conc.	Three volumes
Hydrofluoric acid, 48-52 per cent	One volume
Operate	at room temperature with exhaust ventilation
Time	3-5 seconds

One treatment formerly recommended[6] by Aluminum Co. of America, comprises a sulphuric-chromic acid etch (chrome-pickle). This chrome-pickle treatment produces fairly satisfactory results on certain aluminum alloys, especially when it is used at a sufficiently high temperature (180° F) and when it is followed by a 1:1 nitric acid dip. However, several disadvantages in its use have recently been pointed out. First, chromates are undesirable in plating rooms where they may contaminate other solutions, and there is a possibility that a chromate film may remain on the surface of the work as it enters the zinc immersion preplating step. More important, however, is recent evidence[3] that the chrome-pickle treatment does not effectively remove certain undesirable constituents from the surfaces of some types of aluminum alloys.

According to work reported from the Aluminum

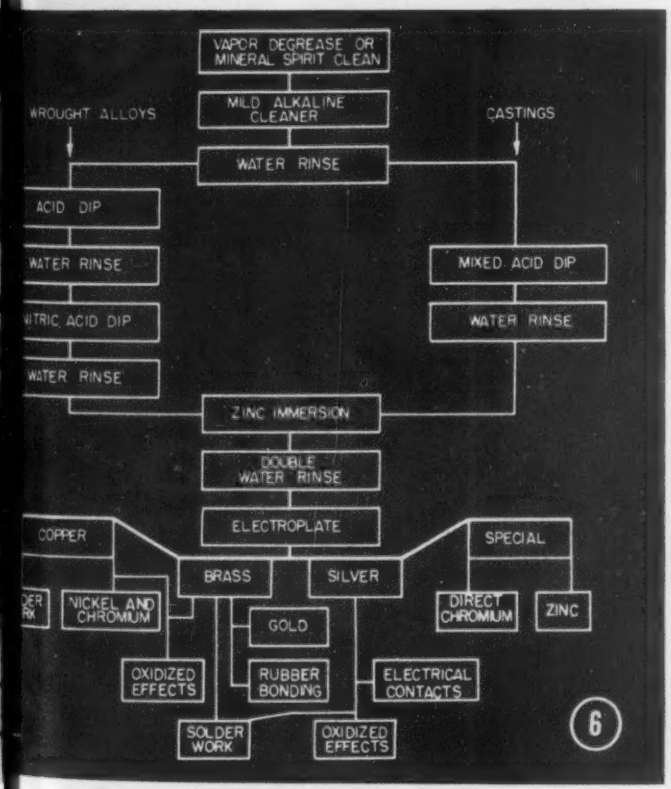


Fig. 6—Electroplating on aluminum zinc immersion process flow sheet

TYPICAL PRODUCTION LINE OPERATIONS USED FOR PLATING ON ALUMINUM

Wrought Aluminum Alloys

Step I —Clean
- A. Vapor Degrease or Mineral Spirits
- B. Alkaline Clean
- C. Water Rinse

Step II —Acid Dip—25% H_2SO_4 5 min. at 180° F.
Step III —Water Rinse
Step IV —Nitric Acid Dip—1:1 HNO_3 at room temperature
Step V —Water Rinse
Step VI —Zinc-Immersion Treatment
Step VII —Double Water Rinse
Step VIII—Electroplate

Cast Aluminum Alloys

Step I —Clean
- A. Vapor Degrease or Mineral Spirits
- B. Mild Alkaline Cleaner
- C. Water Rinse

Step II —Mixed Acid Dip
- Nitric Acid (conc.) . . . 3 vol
- Hydrofluoric acid (48%) 1 vol
- Time—3 to 5 sec.; room temp.

Step III—Water Rinse
Step IV—Zinc-Immersion Treatment
Step V —Double Water Rinse
Step VI—Electroplate

Research Laboratories, a more effective acid treatment for removal of the natural oxide film and undesirable constituents employs a hot acid etch containing 25 per cent sulphuric acid (by weight) for about 5 minutes, at a temperature of 180° F. This treatment produces uniformly good results on all wrought aluminum alloys, especially when it is followed by a dip in 1:1 nitric acid.

Another effective conditioning treatment has been mentioned by Ehrhardt and Guthrie[7] which involves a double dip in the zinc-immersion solution, the first zinc deposit being removed by a dip in nitric acid. This procedure has been recommended for bright nickel plating directly on 2S aluminum. In any case, to secure the best results with the all-important zinc-immersion preplating step, it is essential that the various conditioning treatments provide a suitably clean and uniformly active surface for deposition of the zinc.

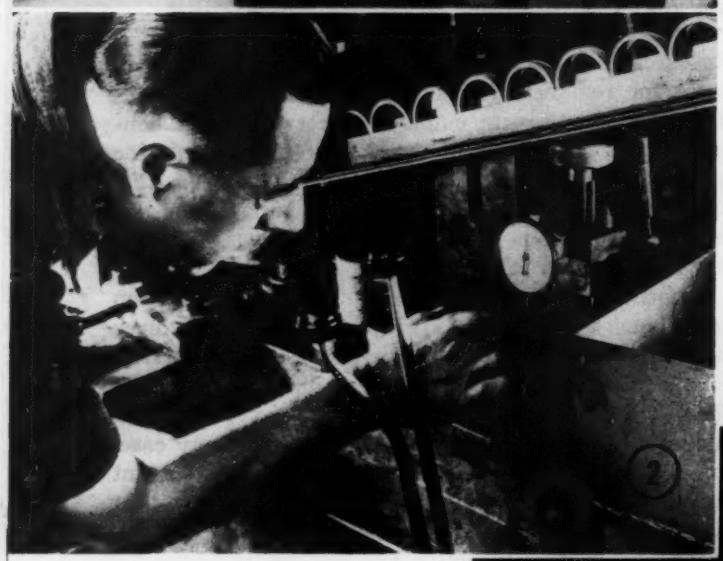
Zinc Immersion Treatment—Since aluminum is less noble than most of the common metals, it will replace many of them from solutions of their salts. This property forms the basis for the zinc-immersion preplating step. The chief function of this procedure is to remove the very thin oxide film from surface of parts to be plated and to replace it with a thin layer of metallic zinc. This provides the aluminum with a surface that is receptive to electroplates of other metals. For this immersion treatment a strongly alkaline solution of the following composition is recommended by Aluminum Co. of America.[3]

Caustic Soda (Commercial 76 per cent)	525 grams
Zinc oxide	100 grams
Water to make	1 liter

The dip solution is maintained at room temperature (60-80° F).

Proprietary dip solutions of this general type are also available. One preplating treatment process known commercially as the Alumon process developed by Enthone Inc. uses a dip that deposits a zinc-copper alloy which adheres to the aluminum and serves as a base for electroplating.[2] The actual adhesive bonds formed between the electrodeposited metal and the base aluminum have been described as approaching the rupture strength of the aluminum alloy itself. Several hundred installations are reported to be using the Alumon process.[8]

When a properly conditioned aluminum alloy article is immersed in the sodium zincate type preplating solution, the thin and uni- (*Please turn to Page* 116)



Integrated Q

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How Federal turns out large quantities and varieties of accurately constructed bearings is the story of dovetailing inspection techniques with manufacturing processes

INTEGRATION of inspection and other quality control techniques in the manufacture of metal products is nowhere better illustrated than in the machining and assembly of ball bearings. Precise dimensional tolerances of the components demand that extraordinary care be exercised in each production step, so that final assemblies will meet specifications. To ful-

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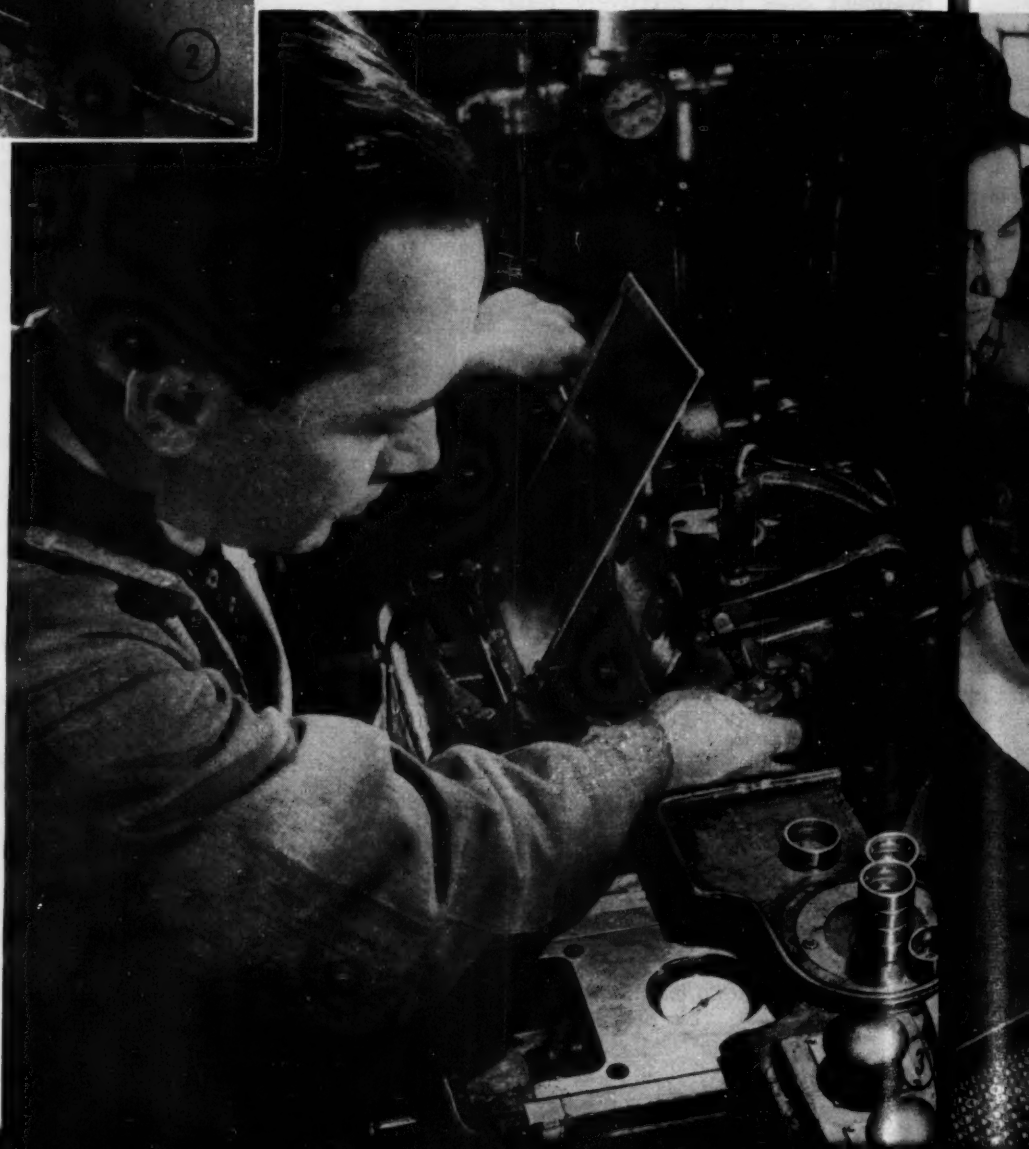


Fig. 1—Batteries of Cone and New Britain automatic screw machines turning outer rings. Note inspection bench at right

Fig. 2 — Operator of a Gardner grinder gaging parallelism of outer ring sides. This machine grinds both faces of outer ring or inner ring at the same time

Fig. 3—This Landis outer ring race grinder has a built-in gage for quick inspection of work

Fig. 4—Heald Gagematic grinder grinding bore of a bearing inner ring. An air gage checks dimensions

Fig. 5 — Cincinnati centerless grinding inner or outer ring outside diameter

By WALTER F. TOERGE
Associate Editor, STEEL

Quality Control

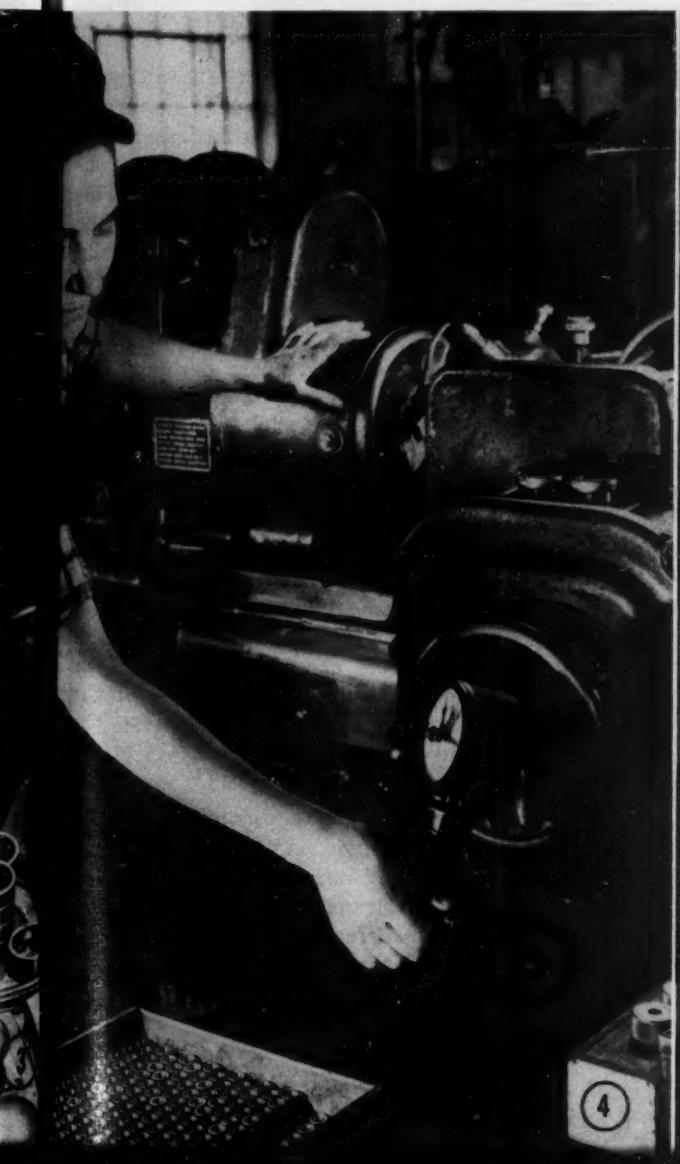
ble large-scale production of precision bearings

fill these requirements, The Federal Bearing Co. Inc. has developed quality control to the point of extreme efficiency at its Poughkeepsie, N. Y., plant.

Immediate results of the program are tremendous quantities and wide varieties of precision bearings to fill the demands of automobile, tractor, machinery and electric motor producers. Reduced final inspection costs, less scrap and infinitely smoother processing routines constitute other significant benefits accruing by virtue of the system.

Methods and equipment for guaranteeing sound, accurately machined bearing components take many forms at Federal. They start with established tests and analyses for physical and chemical properties of bar and tubular stock, flats and strip from which bearing components are machined. Inner ring or cone and outer ring are SAE 52100 high chromium steel; mild carbon steel is used for the ball spacers or separators.

Balls are manufactured by the company's subsidiary, Waterbury Steel Ball Co. Inc., Waterbury, Conn. They are finished and sorted according to size at Waterbury. Upon receipt at the Poughkeepsie plant, sample balls from every lot are checked for diameter, sphericity, surface finish and crush-resistance. Inspection for dimensional accuracy takes place on electro-limit gages; crush testing to determine maximum loads balls are capable of withstanding is performed on a Tinius Olsen hydraulic testing machine. The company maintains a modern metallographic lab-



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oratory equipped with a Bausch and Lomb Metallograph for examining internal structures of fractured test pieces.

Simultaneous Machining-Inspecting—Since quality control is practically indistinguishable from the processing operations, an appreciation of its effectiveness can be gained only by reviewing the necessary steps in turning out a typical ball bearing assembly. For example, the following operational sequence is used on Conrad-type open bearings. The outer ring is machined from tube or bar stock on batteries of Cone and New Britain Gridley multiple-spindle automatic screw machines. In this operation, the rings are turned to the outside diameters, inside diameters and lengths, as specified by engineering. Also, races or ball grooves are roughed out in machining. Specifications provide for a certain amount of stock to be ground off later.

Inspection at this point starts with the machine operator, who continuously spot checks the parts, using as many as six or eight dial indicator gages mounted on a conveniently located table. He is assisted by representatives of the inspection department whose function it is to maintain constant patrol supervision over all quality control activities. If dimensions of a part are found to be outside tolerances, the entire batch is segregated and inspected 100 per cent. Also at this stage, dimensions on which no further corrective work can be made subsequent to the screw machining operations, are inspected 100 per cent. The washer groove in one type of water pump bearing is an example. If this is not correctly machined, it can become a source of trouble in later assembly. Optical comparators aid inspectors in examining grooves on outside surfaces quickly.

Grinding Operations—Lots released to the next operation proceed to Gardner grinders where both faces are soft ground simultaneously by grinding wheels mounted in a vertical position. Parallelism of the two faces is one of the primary considerations in this particular step. They are then moved to the modern heat treating department and hardened in controlled atmosphere conveyor type furnaces. Temperatures of the various hardening, carburizing and tempering furnaces are recorded in the furnace control room; a permanent record of furnace performance is also maintained. Following hardening, samples of each lot of rings are laboratory-tested for hardness, tensile strength, fracture-resistance and other physical properties.

Next, the outer rings return to the Gardner grinders to be ground to exact dimensions on width. Cincinnati centerless grinders bring outside diameters of the outer rings to the proper dimensions. The cooperative efforts of both operator and line inspector yield extremely gratifying results in controlling these critical dimensions within established tolerances. All outer rings are intercepted at this point and given 100 per cent inspection on dial indicator gages, visually inspected for other flaws such as seams, surface imperfections—defects which might show up after machining.

Special Vigilance—Bearing engineers generally consider the race or ball groove to be the most vital

Fig. 6—Gaging individual rings for classification as to exact race diameter. Rings will then be selected for assembly with appropriate sized balls

Fig. 7—Checking wobble on outer ring and inner ring of bearing assemblies

Fig. 8—Load testing apparatus designed by Federal engineers to check radial and thrust loads to predetermined standards

Fig. 9—Production inspection bench. Here outside diameter grinding, race and ball widths are checked, also chatter, chamfer marks. Inspectors examine all bearings before they are released for shipment

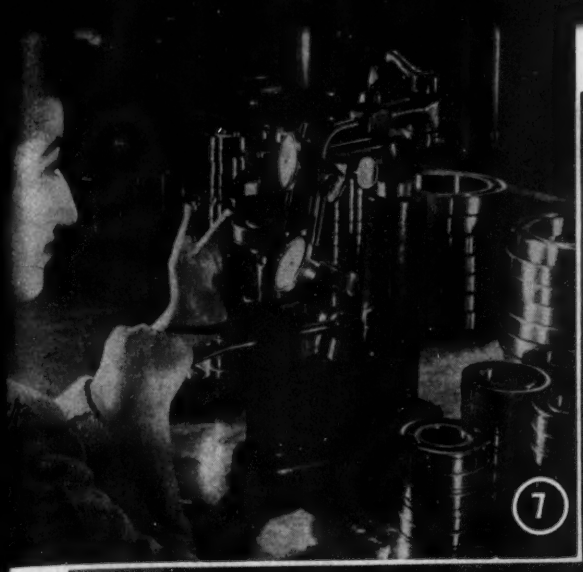
Fig. 10—Inspecting finished bearing for end play

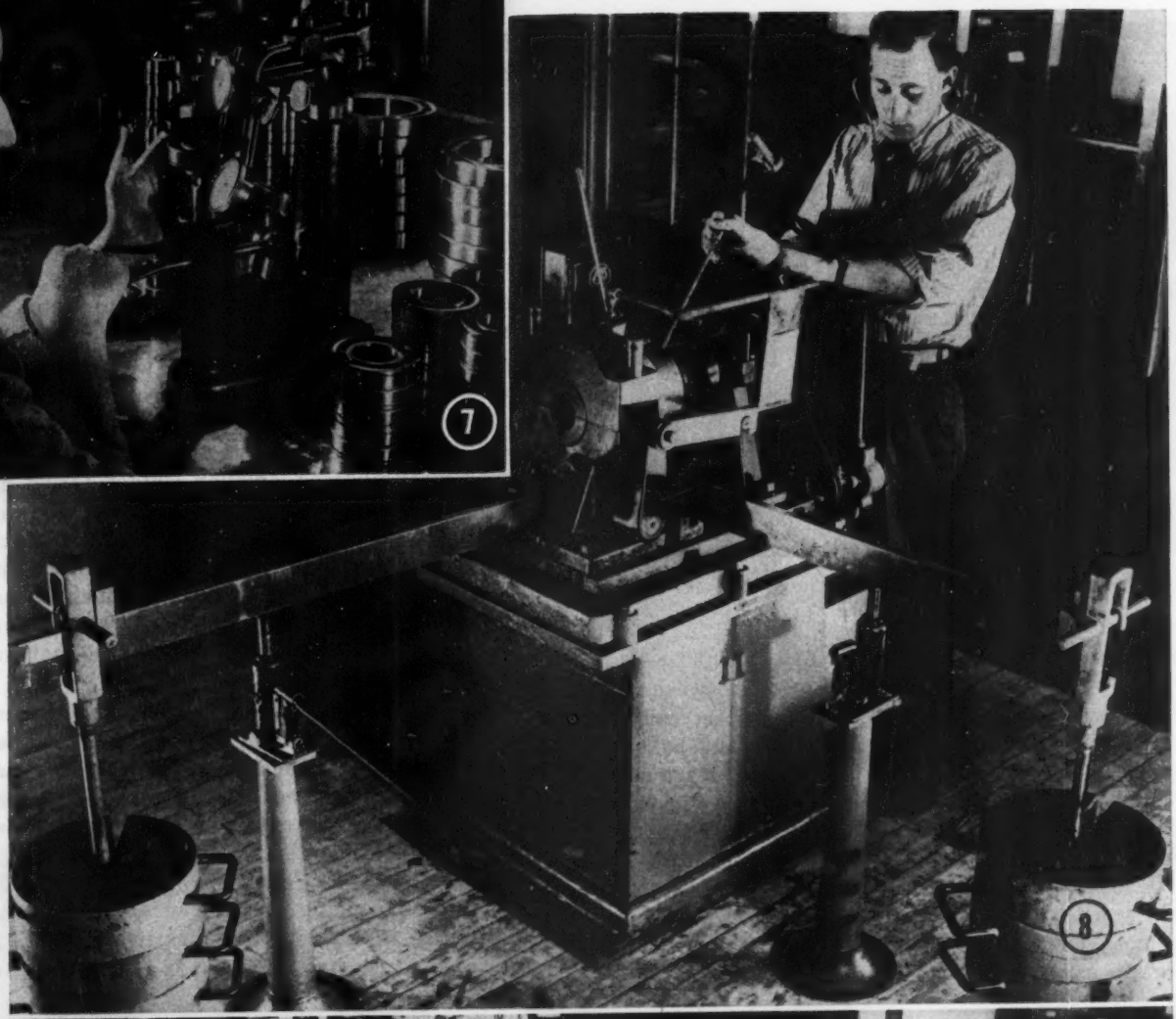
point of the entire bearing assembly (if the designation "most vital" is to be assigned to any one of the many important locations in a bearing assembly). Bearing life and quiet running depend upon the dimensional and finish characteristics of the race. Finish is measured in microinches. Consequently, at the race grinders the inspection department is especially vigilant for substandard conditions in eccentricity and finish as well as for errors in overall dimensions. Race grinding is performed on Landis and Van Norman machines and on special grinders designed and built by Federal for this specific job.

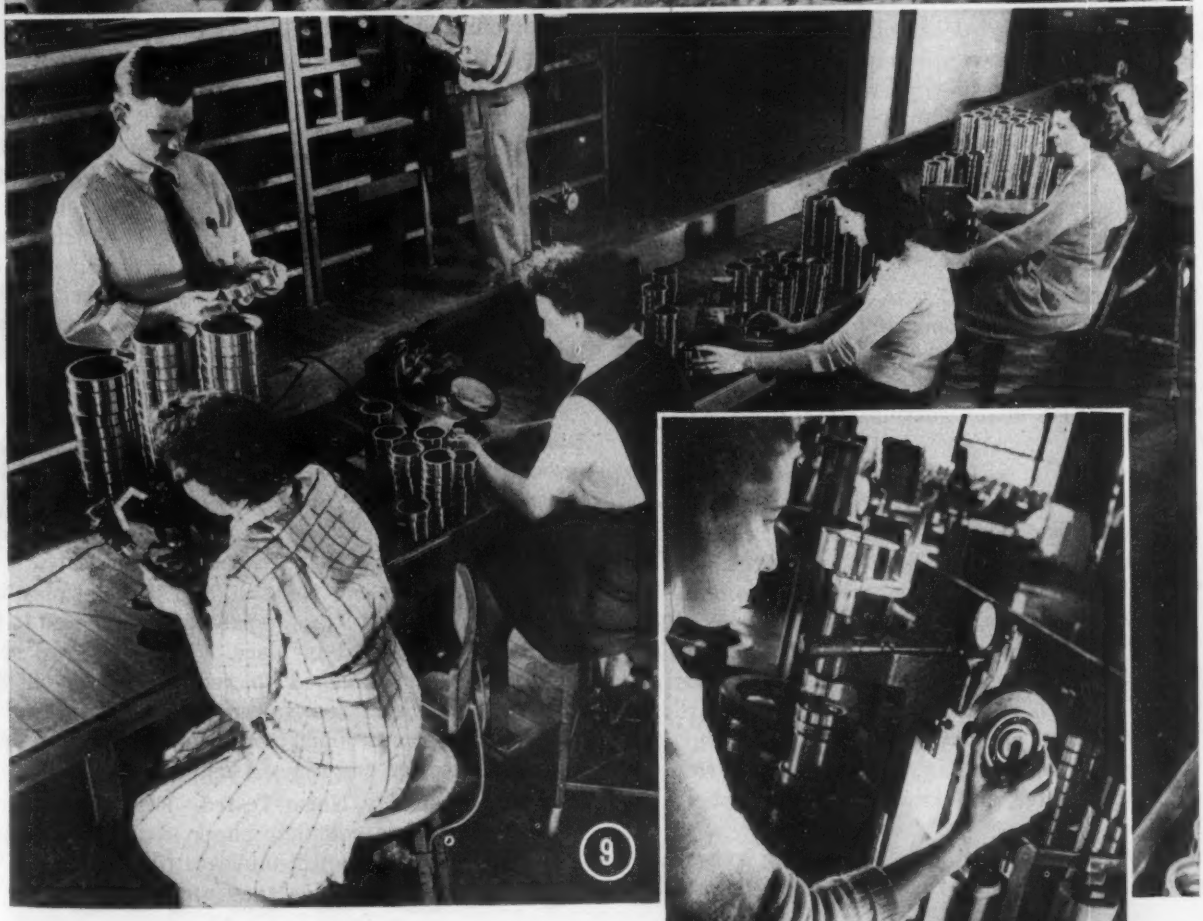
Patrol and operator inspection during and after race grinding includes diameter, race roundness, race curvature or contour, race location or centerline, eccentricity and race parallelism with face. Race diameter and race roundness are checked with a 120-degree three-point dial gage on which two points are fixed and one is movable. A button gage or wiper is used to inspect race curvature. Race location gages are designed with movable arms which ride in the race to locate race with respect to the face of the outer ring. An eccentricity gage is built to ride the outside diameter and to establish the relation of the race with the outside diameter.

Central Inspection—After race grinding, sample rings are taken to a central inspection room and given Wavometer and Profilometer tests. As their names suggest, the testing instruments analyze waviness and finish of race surfaces. Magnafluxing picks up burns and checks on the entire part.

The outer rings are next sent to the polishing department where the surface finish of the race is im-







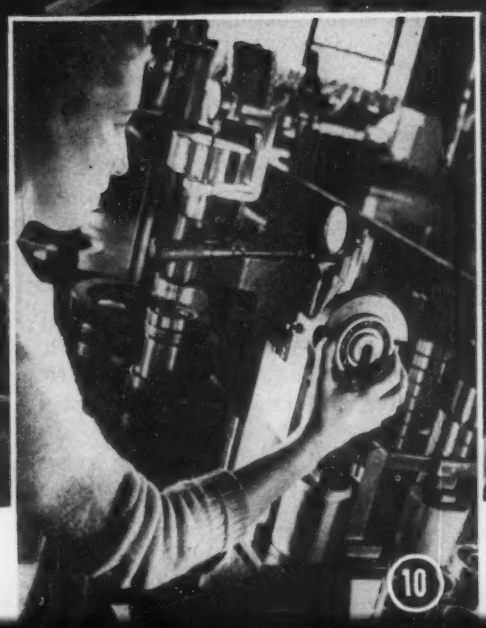


Fig. 11—Every bearing is given a noise test in a sound-proof booth

proved. From the polishing department, the finished outer rings move on to a continuous alkaline washer to be washed and rust-proofed. They are then ready for assembly with inner rings, separators and balls.

Like the outer rings, cones or inner rings start as tube or bar stock which is turned to specified dimensions on the automatic screw machines, soft ground on the Gardners, stamped, if necessary, and heat treated. After heat treatment, the hardened inner rings return to the Gardner grinders to be ground to a specified width dimension. Outside diameters are brought to size on the Cincinnati centerless grinding machines.

In the bore grinding department, Heald Sizematic and Gagematic machines are employed to advantage. By means of air gages located at the machines, operators inspect the bores 100 per cent for size (diameter), taper and roundness. Line inspectors measure the same dimensions on a percentage of all cones at the bore grinders. In general, if the outside diameter is correct, the shape and condition of the bore will also be correct.

Close Controls Exercised—As in the case of outer rings, the race grinding operation is also of critical importance on inner rings. Again, this grinding is performed on Landis, as well as on Van Norman machines, and under strict surveillance practices. Inspection catches variations up to 0.0001-inch, using the same checking tools as were employed on the outer rings to examine parts for dimensional accuracy, race roundness and diameter. Eccentricity in the case of the inner ring is the relationship of the face with respect to the bore. Groove wobble in relation to the bore is measured on an arbor. The part is mounted on a suitable arbor, placed between centers and turned one revolution. An indicator gage contacting the groove shoulder indicates the groove wobble. Inasmuch as chatter is generated by grinding wheels in race grinding, it is necessary to test races of both outer and inner rings for extent of chatter.

During the succeeding step, inner ring races are polished and at the same time spot checked for surface finish, waviness, visual defects. They are then washed and rustproofed and sent to storage or assembly.

Ball spacers or separators are stamped from cold rolled steel blanks on Bliss presses using single and progressive dies. Separator halves are first blanked, then drawn or crimped and restruck to conform with ball contours. The halves are riveted together or locked by means of lugs during final assembly. Many different types of separators are made to match the numerous bearing designs.

Variety of Bearings—It might be well to pause at this point to mention some of the bearings produced at this plant. In addition to the Conrad type, whose manufacture is being traced in this article, the company makes self-aligning, angular contact, thrust, and water pump bearings, in light, medium and heavy series, double row (of balls) bearings and special units for special applications. In the field of automotive bearings alone, the company's products include bearings for transmissions, fan and water pumps, front and rear wheels, clutch release mechanisms, generators and starters.

The thoroughness of Federal's constant unrelenting in-process quality control practices is everywhere evident in the cutting and shaping of components. The necessity for stringent measures becomes immediately apparent in the assembly department. Here the efficiency of the previous inspection methods is proved. The slightest relaxation of quality requirements in the machining departments can be quickly translated into scrapped parts and consequently increased costs, when the time comes to put the bearings together.

Complicated Assembly Practices—In the actual assembly of the bearings, assemblers gage individual outer rings, separate them into different diameter size groups and place them on spindles of a special rack located next to the assembly table. Next they select matching inner rings by the same process. The proper number of the appropriate sizes balls is inserted in special fixtures holding an outer ring; and the inner ring is then snapped into place. The entire process, performed deftly by experienced personnel is simply a matter of selecting the right combination of components, using "gaging balls", and then putting them together.

Assemblies at this point receive 100 per cent inspection on end play. Assembly jigs are actually precision gages which measure the amount of end play. These devices hold the outer ring firmly in a horizontal position. The cone is moved by means of a vertical plunger, and the displacement indicated.

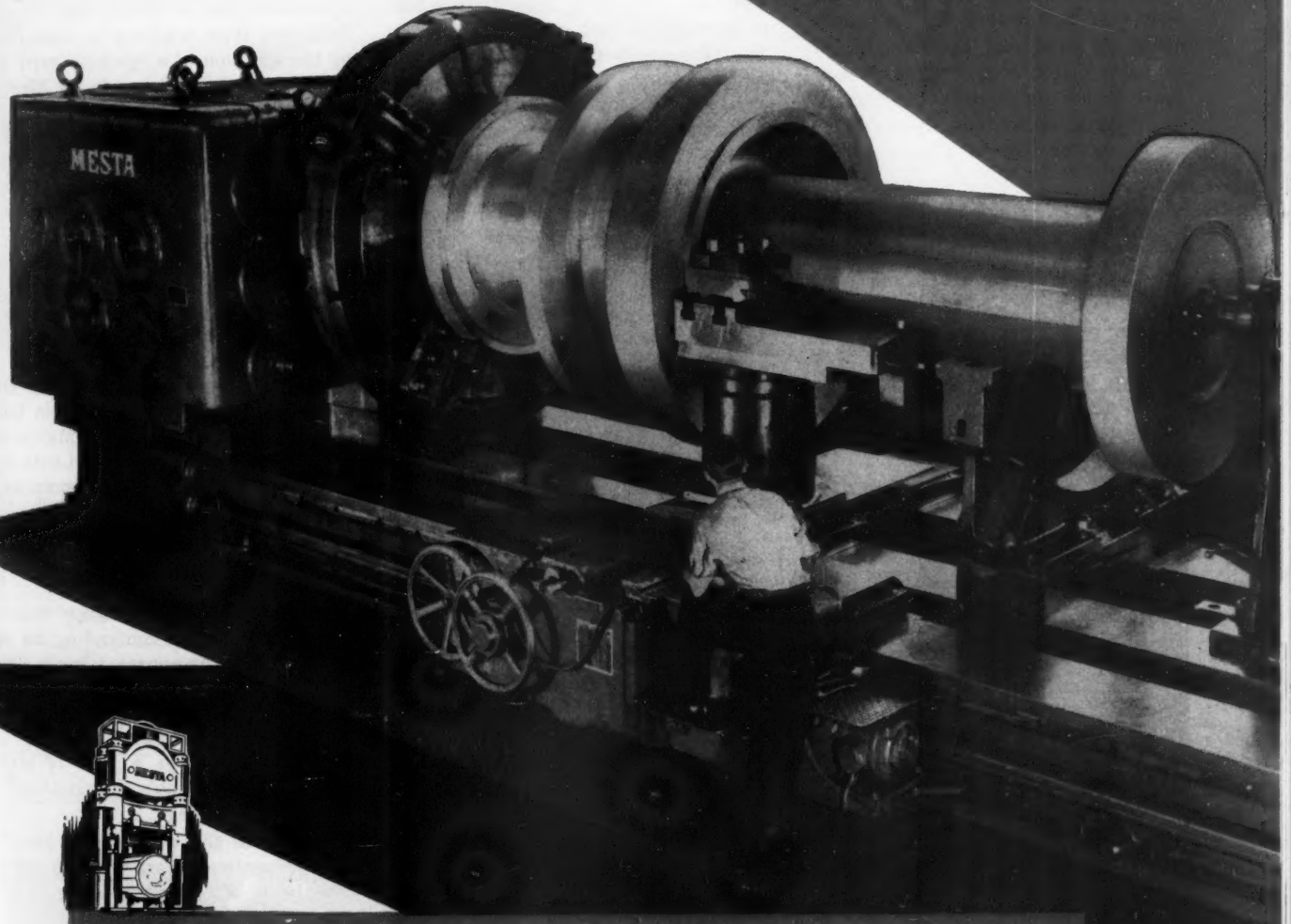
After the balls are inserted, and the end play test completed, the spacers or separators are placed in the assembly and locked in place. The completed bearings are then rewashed to remove traces of dirt, solvent, chips and foreign matter, then sprayed or dipped in a rustproofing compound to protect parts against corrosion and remove fingerprints.

Every Assembly Noise Tested—Every bearing assembly is given a complete check in the final inspection department. Gages duplicate those found in the shop. In final inspection they are arranged to make

MESTA forgings

Mesta Forgings include massive crankshafts, marine parts, rotor shafts, rolls and pinions, pressure vessels, pump blocks, table rollers, and many others.

The massive rotor shaft shown, forged from ingot poured in the Mesta Open Hearth Department, is being turned for a turbine driven generator installation at one of the world's largest dams.



DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY

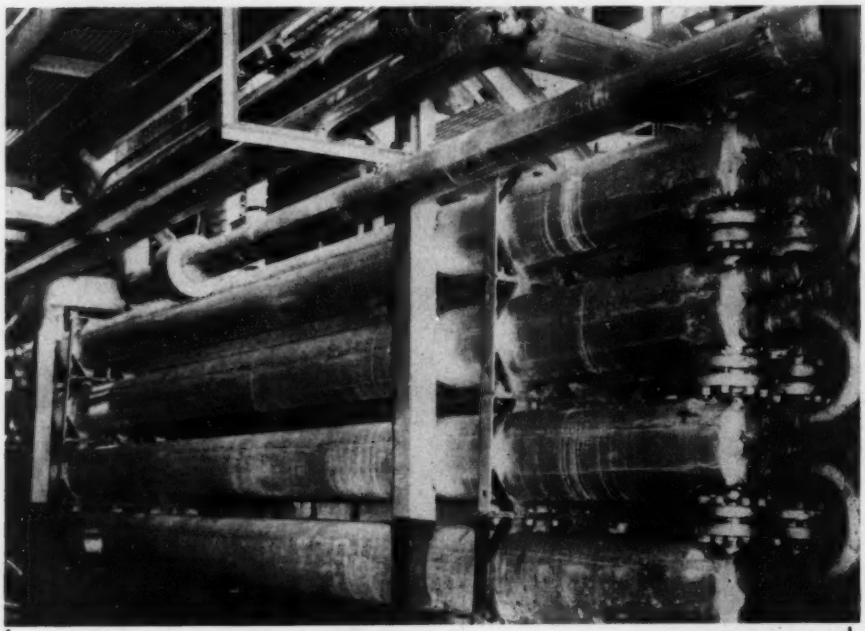
PITTSBURGH, PA.

all measurements as conveniently as possible. Acceptable bearings are slushed in rustproofing oil and noise tested in soundproof booths. Each bearing is slipped over a shaft connected to a quiet motor and run at a specified speed. Experienced operators can immediately detect any unusual sound. This noise test is at times supplemented by an Anderometer test.

The Anderometer is similar to the manual sound-testing equipment. The bearing inner ring rotates at 1800 rpm while the outer ring is held stationary. A pickup resting on the outer ring makes it possible to amplify noise which in turn indicates surface characteristics of the race. Meters on the instrument can give an accurate picture of waviness, chatter or other conditions contributing to the bearing's operating sound.

But this is not the end of Federal's quality control efforts. Bearing life, applications, atmosphere, temperature and lubrication factors, causes of failure are all constantly being observed and analyzed in the company's test room. This department is set up to test bearings to destruction under conditions which approach or exceed those under which they will be expected to operate in the field. Data gathered here may affect design considerations, machining techniques, heat treatments or materials. Special experimental work is carried on along with routine fatigue and load testing. Many of the test devices used here were designed by Federal engineers.

The company is also engaged in statistical quality control whose purpose is to eliminate waste and to realize the full capabilities of all the machine tools. As expressed by one of the Federal engineers, the idea is to let each machine "talk" through accurate production figures and then make reasonable demands on its actual capacity, changing engineering specifications if necessary. Demands on the manufacturing equipment may be excessive or unreasonable, necessitating either change, repair or modification. The program is actually a frank continuing self-examination to be sure every production economy is exploited to control costs. A tremendous amount of statistical work is involved to find out exactly what the machines can do. Average charts, range charts, per cent defective charts, frequency distribution curves, cost charts are among the contrivances employed in the analysis.



JACKET FOR OUTDOOR WEAR: Consisting of 0.0055-inch Alcoa corrugated aluminum foil bonded to an insulating barrier, a long-life sheathing for insulating pipe lines is said to be entirely weather-resistant. Developed by Childers Mfg. Co., Houston, for use in refineries and industrial plants, sheathing is easily applied around turns, flanges and connections. Most applications are secured with a plastic film tape developed by Minnesota Mining & Mfg. Co. Other installations use aluminum fastening strips and sheet metal screws. Illustration shows an application on 16 heat exchangers and other large piping in a large eastern refinery

Finishing Systems Up Output

STRATEGIC location of wash units, paint spray booths, dry-off and finish bake ovens in the conveyor lines has brought about faster and more efficient results in the tractor finishing layout of Oliver Corp., Charles City, Iowa. Designed, built and installed by Despatch Oven Co., Minneapolis, the layout is virtually three conveyorized systems, all of which are accurately timed and located as to deliver their parts at specified assembly points at the proper time.

Two monorail continuous conveyors handle wheels, rims and miscellaneous parts, carrying them through the various stages of the finishing process. Production is said to have been increased 50 per cent over previous production with the former method of materials handling.

Shovel Mounted on Tractor

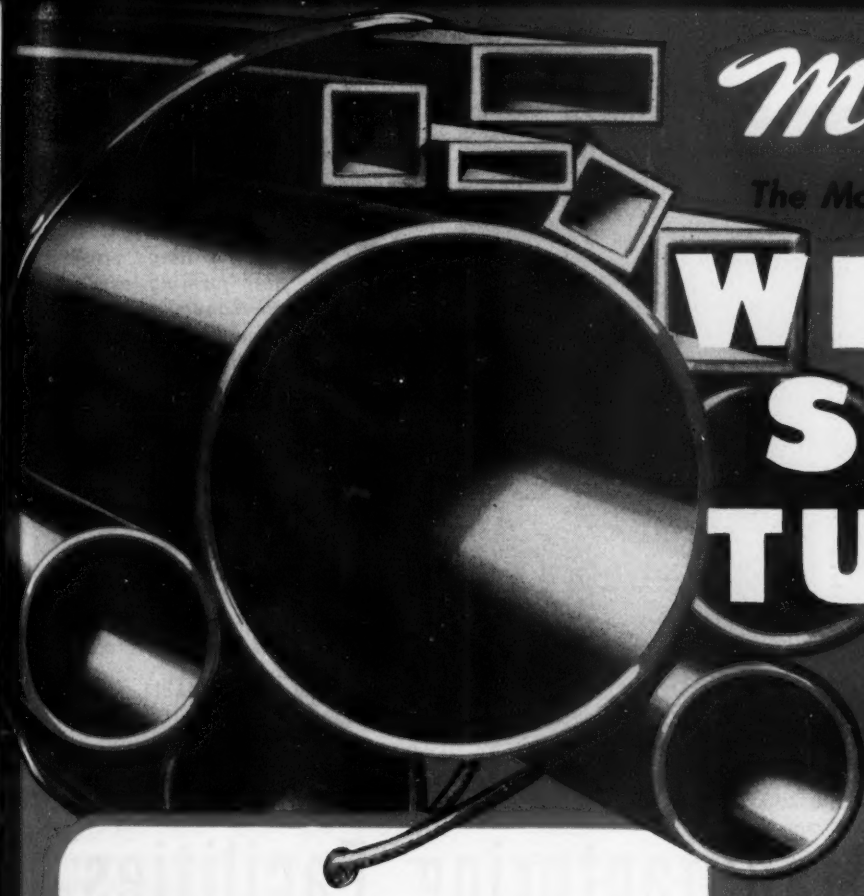
VERSATILITY of Caterpillar D7 and D8 track-type tractors is enhanced by the addition of a ½-cubic yard capacity shovel front, made by Hyster Co. of Portland, Oreg. It brings to seven the number of interchangeable variations for the tractor-mounted Hystaway, the others being crane, dragline, clamshell, hoe front, bulldozer and pile driver.

Shovel front may be mounted on either new or used machines without major alterations. Use of the bulldozer attachment is retained with the complete Hystaway installed; it takes 1 hour to dismount the Hystaway to allow full production bulldozer use, it is stated. Maximum clean-up radius at floor level with the shovel is 18 feet with the boom at a 35 degree angle.

Apprentice Training Guide

DESCRIBED as a working manual for setting up and conducting an apprentice training course, a book, "Apprentice Training Standards," is available from National Machine Tool Builders' Association, Cleveland. It is a result of over a year of study by the association's committee on apprentice training.

Nature of the work to be done by the apprentice is specified in detail. The book also contains samples of the forms required, including the application for apprenticeship, the apprenticeship agreement and the work records required. A bibliography on the subject of machine tool practice and apprentice training is included. Book is being made available to industry in general by the association.



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Tube Diameter O.D. Size	Maximum Wall BWG Decimal	Gauge	Minimum Wall BWG Decimal	Gauge
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⅜	.065	16	.022	24
½	.083	14	.022	24
⅝	.095	13	.022	24
¾	.095	13	.022	24
⅞	.095	13	.022	24
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.028	22
1⅜	.095	13	.028	22
1½	.095	13	.035	20
1⅝	.120	11	.035	20
1¾	.120	11	.035	20
1⅞	.120	11	.035	20
2	.148	9	.035	20
2⅛	.148	9	.035	20
2¼	.148	9	.035	20
2⅜	.120	11	.035	20
2½	.148	9	.035	20
2⅝	.120	11	.035	20
2¾	.148	9	.035	20
2⅞	.148	9	.049	18
3	.148	9	.049	18
3⅛	.148	9	.049	18
3¼	.148	9	.049	18
3⅜	.148	9	.049	18
3½	.148	9	.049	18
3⅝	.148	9	.065	16
3¾	.148	9	.065	16
3⅞	.148	9	.065	16
4	.148	9	.065	16

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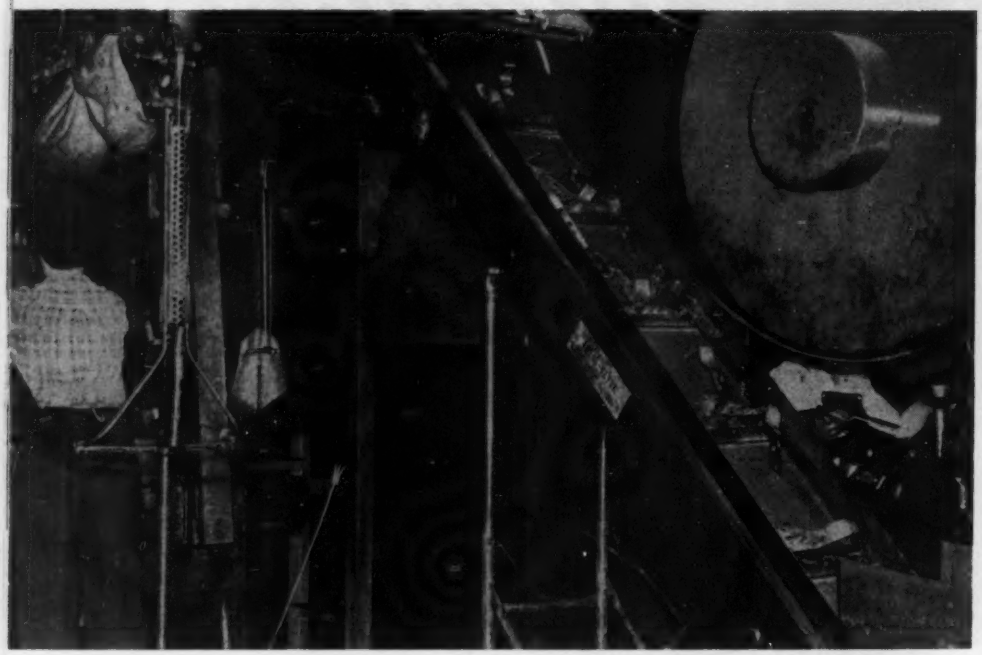


Fig. 1—Parts are transferred from one press to another by means of inclined conveyors. Operator partially hidden by the press flywheel at right is about to place a hinge strap after the first forming operation onto the conveyor in the right foreground. Straps are then deposited in the hopper adjoining press at left. Operator removes parts from chute at base of hopper, carries out the second forming operation and then puts the part on another inclined conveyor for subsequent processing

By A. H. ALLEN
Detroit Editor, STEEL

Regrouped Manufacturing Facilities

. . . and co-ordinating handling aids result in record production of automobile hinges

CONTINUING high-level automotive output has found many parts suppliers expanding their facilities and adding to labor forces in the effort to keep pace. Among others, door hinges are parts required in large volume, since two are required for each door, and the four-door sedan is the leading type of body now in production.

A principal manufacturer of automotive hinges is Soss Mfg. Co., Detroit, a company which began hinge manufacture over 40 years ago in Brooklyn, N. Y., output then being mainly for furniture and general building purposes. Soss first developed concealed type door hinges for automobiles in 1914, subsequently transferring its operations to Roselle, N. J. The company continued enjoying steady growth when in 1937 it started operations in Detroit and in 1941 transferred all of its activities to its present location in Detroit. In August, for example, a postwar record was reached with shipment of 650,551 hinges, with a new daily peak of 36,222 being set on Aug. 11. Two 8-hour shifts are operated daily.

Pressed Steel Housing—The hinge assembly comprises a pressed steel housing with a spot welded cap, the housing being recessed and bolted to the pillar and the cap acting as a cover; the strap or arm is a tapered rolled steel section, bolted to the door and fitted to the housing by means of a steel pin. The strap is formed into suitably curved section so that when the door is opened it is swung away from the car body; when closed

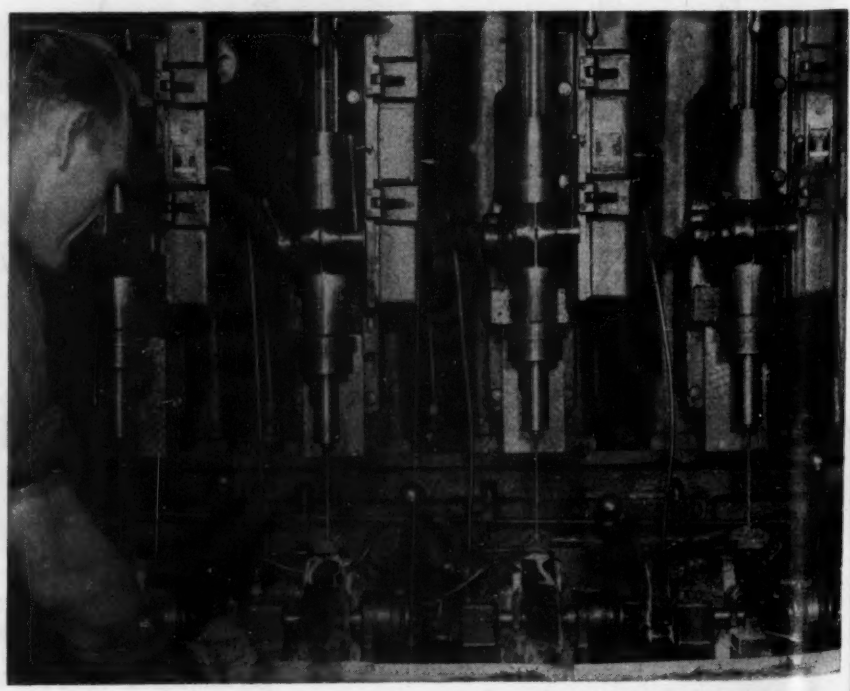


Fig. 2—Unusual drilling operation is performed by this Leland-Gifford "woodpecker" drilling unit, two of which are operated on each production line for the oil hole in the hinge strap

the hook in the strap recedes into the cap of the housing, permitting the door to be closed up flush and tight with the body.

Strap section is SAE 1020 hot-rolled steel, and is formed from die-rolled bar stock, received in approximately 12-foot lengths. Strap multiples range in length from 9 to 14 inches, depending upon the size of the hinge. Each bar contains a specified number of multiples or straps, the die rolling process resulting in one tapered section following another. Finished thickness at the thin end is about ⅜-inch, at the pin end, 1 inch. First operation is to shear them apart, following which they are started through a series of milling, forming, piercing, broaching, drilling, chamfering and reaming operations before final assembly.

Housing and caps of SAE 1010 are formed from 0.156 and 0.032-inch strip steel received in coils and fed through rolls into the initial blanking operation, after which are various forming and piercing operations. Housings and caps are produced separately, finally being assembled by spot welding.

Equipment Rearranged—Until recently, the various broaching machines, power presses, milling operations were arranged more or less indiscriminately, parts being moved from one to another in tote boxes and shop trucks. This proved uneconomical as production requirements mounted, so engineering studies were made to regroup all equipment on a straight-line basis. Result was that six "lines" were set up, each comprising two adjacent lines, one for housings and one for straps. Thus there are in effect 12 lines of equipment, six for straps and six for housings. Each line includes 15 operating stations, although not all are required for every type of hinge produced.

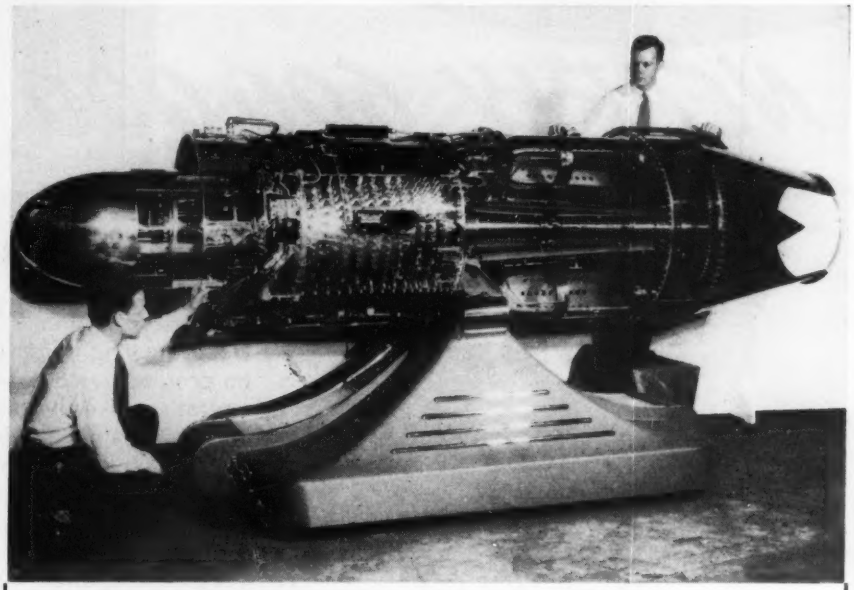
Unusual drilling operation is performed by a Leland-Gifford "woodpecker" drilling unit, two of which are operated on each production line for the oil hole in the hinge strap. This hole, 0.187-inch diameter, runs at right angles to the hinge pin, extending from the hinge pin hole out through the tapered strap for a distance of about 2 inches. It allows quick lubrication of the pin. Because of the small diameter and the comparatively deep hole involved, it is necessary to drill it in small "takes," retracting the drill bit after about every ¼-inch to remove accumulated chips. Each drill spindle is cycled automatically and because of the fairly rapid reciprocation, the unit was dubbed "woodpecker".

One machine is a six-spindle and the other a four-spindle design. The operator has only to release the arm at the right of each fixture, remove the part and place it on a nearby inclined conveyor, load another part and lock it in place. The machines were built specially for this work and have appreciably reduced drill breakage on the job, in addition to keeping pace with the high production rate.

Inclined Conveyor Units—To move parts from one operation to the next, electrically powered inclined conveyor units known as Press-Veyors were positioned so that parts coming from a press, for example, can be tossed on the conveyor which moves them up into hoppers feeding the next operation. These conveyor units are more or less portable, supported by a welded tubular steel frame. They can be positioned for the maximum convenience of machine operators. The production lines involve approximately 180 units of equipment, and practically that number of Press-Veyors.

With raw stock fed in at one end of the plant, the parts progress down the two lines and at the other end finished straps and housings converge at an assembly station, where a horizontal air-operated machine forces the hinge pin in position and the completed hinge is inspected, packed and taken into the shipping department by Towmotors, available for shipment. Each line is arranged to handle many different designs of hinges, requiring only replacement of dies in presses and resetting fixtures on machines.

The rearranged plant, and the production records it is accomplishing, are excellent examples of what careful planning, integration of operations and efficient materials handling can accomplish in the way of economical low-cost production, not to forget improved labor relations and enhanced profits.



CUTAWAY: Internal operation of the J-47 turbojet which powers the Air Force's largest and fastest jet planes was shown by means of this cutaway in Cleveland recently. Engine whose internal parts rotate as they do in actual operation was manufactured by General Electric Co., builder of the production engine. GE engineers Richard C. Miller and Albert W. Schairbaum are examining the display. Among operating parts shown publicly for the first time is the water injection system which augments the J-47's basic thrust of 5200 pounds at takeoff

Heat Exchanger of Stainless

UTILIZING stainless steel to avoid contamination of fluids or corrosion by fluids is a fully standardized stainless steel heat exchanger, announced by Ross Heater & Mfg. Co. Inc., Buffalo, N. Y., said to be the first such unit to reach mass production. Identical in design capacities to the Ross type BCF exchangers, the new type SSCF units are offered in a range of sizes tested to 450 psi to withstand most strenuous usage.

While type 316 stainless steel is standard, due to its almost universal acceptance in industry, the new exchangers may also be made from any of the well known types of stainless steel. According to the company, complete standardization and stocking of component parts makes possible better delivery and lower cost.

NEARLY 600,000 PIECES—

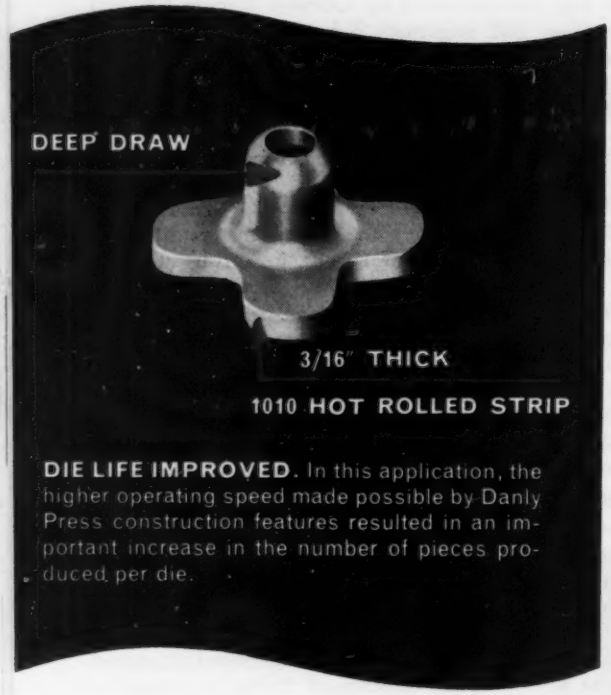
...a new production record made possible by higher press operating speeds

Deep drawing heavy gage coil stock at high speeds on progressive dies is a real test for a press. In this operation, like the one shown, a Danly Autofeed is achieving shift production running close to 4000 units in spite of time required for restocking and die changing.

And in the matter of die life, this production average speaks for itself. Precision closure and extra rigidity built into this Danly Autofeed assure longer runs before die sharpening is required.

Danly Presses Run Longer

Records like this are made possible by exclusive mechanical features found only in Danly Presses. First, there is the new Danly cool-running clutch, designed to outwear conventional press clutches because less destructive heat is generated. And a special forced air cooling system keeps the clutch operating temperature only 35° above room temperature. Other advantages include positive pressure lubrication throughout and sensitive control reaction to facilitate die try outs.



DIE LIFE IMPROVED. In this application, the higher operating speed made possible by Danly Press construction features resulted in an important increase in the number of pieces produced per die.

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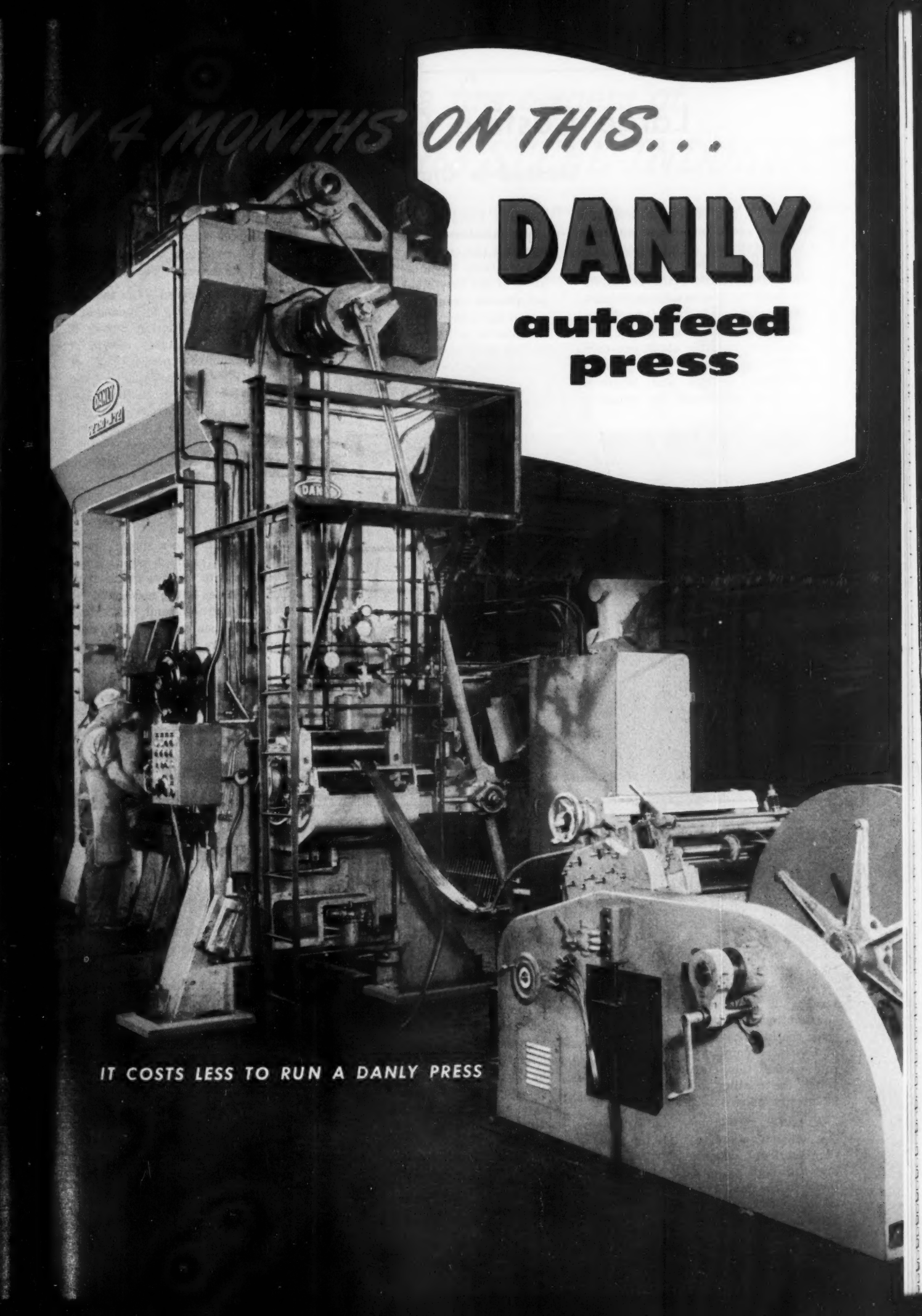
IN 4 MONTHS ON THIS...
DANLY
autofeed
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IT COSTS LESS TO RUN A DANLY PRESS

Large Casting Cleaning Costs

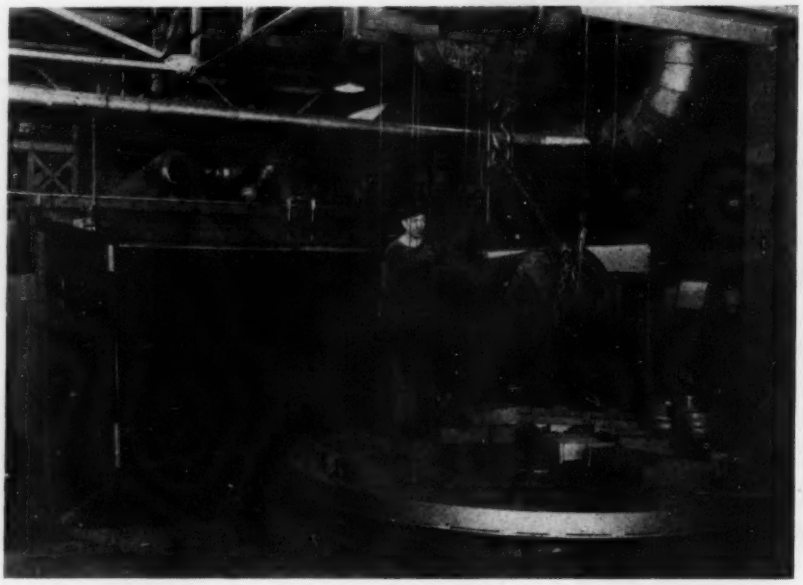
Slashed in Cleveland Plant

FASTER and better cleaning at a reduced cost have resulted from the installation of an airless, centrifugal-type blast cleaning room in the Cleveland plant of Harris-Seybold Co., manufacturer of printing presses. Installed by Pangborn Corp. of Hagerstown, Md., the room requires about one-third the man hours of the previous cleaning method and improves working conditions by removing cleaning room workers from the blast chamber. A single worker operates the entire cleaning room.

Versatility keynotes the installation of the new machine, it being possible to clean articles from 1 pound up to more than 1 ton. The installation is 7 feet 3 inches high, 15 feet wide and 16 feet deep. A power-driven blast room car facilitates loading and unloading of large castings. It enters the blast room on its own track through 12-foot 6-inch doors and is equipped with a revolving work table 10 feet in diameter.

All Sides Exposed—The table is turned mechanically by means of a contact with a friction wheel; it revolves at adjustable speeds of 4.3 to 13 rpm to expose all sides of the castings to the impact of the blast stream. Where castings contain long hollow areas impossible to reach by other methods, the rubber-lined, room-type structure makes any necessary airblast touch-up easy.

Harris-Seybold finds that castings which previously kept the cleaning room busy 24 hours a day are now cleaned in a single 8-hour shift. More thorough cleaning action is said to remove micro-chill, open the pores in the metal and remove all burned sand, scale and rust which accumulates during outdoor exposure for aging purposes.



Blast room car being loaded by overhead crane, prior to moving into the blast cleaning unit in background. Note smaller parts to be cleaned on the revolving platform

Coating Stops Ingot Sticking

IMPORTANCE of mold preparation prior to the casting of steel into the ingot mold is an item which has long received foremost recognition from steel producers. This practice includes the coating of the interior surfaces of the mold with some type of material which will adhere to the mold wall. Disadvantages commonly encountered in the application of such coatings have been several, one of the most common being the narrow mold temperature range in which the coating material will satisfactorily adhere to the mold wall.

A recent development is a coating which contains a high temperature lubricant capable of withstanding the high temperatures encountered in the industry. Developed by Dacar Chemical Products Co. of Pittsburgh and known as Darmold, the use of this lubricant is said to facilitate ingot removal, resulting in greater ease of stripping and reduction of the number of stickers encountered.

Organic chemical ingredients are contained in the new coating. Included are resinous products which are polymerizable and which yield a smooth surface after filling fire cracks and irregularities in the mold wall surface. Also said to be included in this class of chemical ingredients are other organic compounds which provide for penetration of the mold pores, resulting in the build-up of coating material on the mold wall.

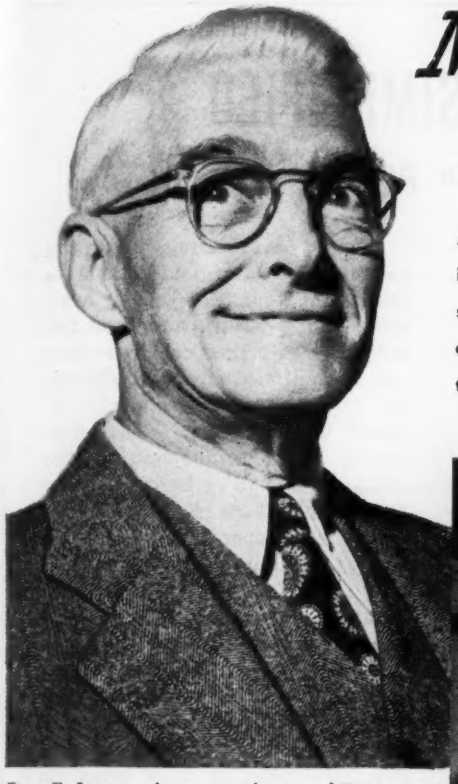
Upon contact with molten steel, the coating decomposition takes place at once, leaving a residual film on the mold wall. Decomposition is complete on contact, so that there is no further evolution of gases after the liquid level has risen, thus eliminating the possibility of blow holes. Splashes during pouring are repelled upon contact with the coating and reportedly do not adhere to the mold wall, due to the evolution of gases on contact. Coating, which may be applied over a wide range of mold temperatures, has no harmful effect on skin or clothing and its vapors are not toxic.

Bronze Alloy is Free Machining

HIGH in lead content, mixture 44 special bronze alloy, announced by Riverside Metal Co., Riverside, N. J., has a machinability of 90 per cent as compared with the best free cutting brass rating of 100 per cent. Because of its high lead content, it can be machined to closer tolerances and at higher cutting speeds without burning or cutter scoring. Alloy is available in rod, sheet, strip and bar forms.

Meet a few owners of the STEEL INDUSTRY

A half million people like these own the 247 companies that make up the steel industry in America. Their savings helped provide jobs for the more than one-half million steelworkers. On the average each stockholder owns fewer than 75 shares. Many of them own fewer than 10 shares. Read how these steel stockholders have faith in the future of the steel industry and of our American system.

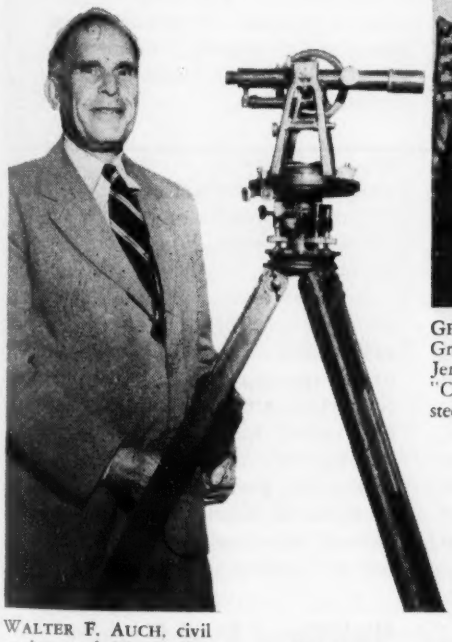


FRED E. JANSEN, insurance salesman of Freeport, Long Island, N. Y. declares . . . "Steel is essential business. It is the very foundation of our country."

BERTHA H. SCHEFFLER, Rutland, Vermont, former 1st Lt., W.A.C. says . . . "While in Service I invested in steel stocks. This enabled me to open up my own Women's Exchange Shop."

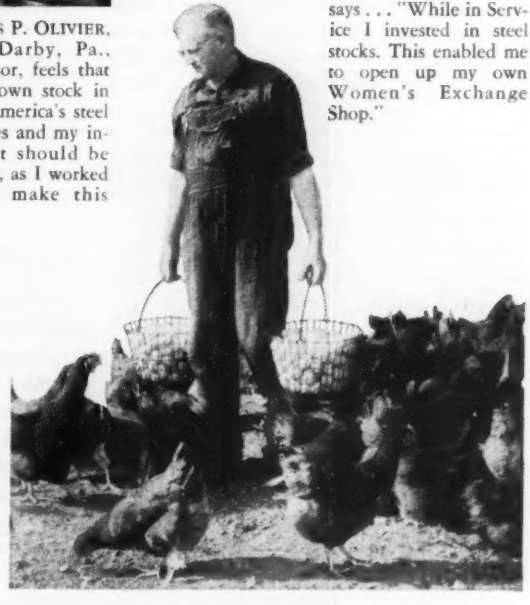
CHARLES P. OLIVIER, Upper Darby, Pa., a Professor, feels that . . . "I own stock in one of America's steel companies and my investment should be protected, as I worked hard to make this money."

GEORGE W. HAGEDORN, 1506 Grand Ave., Asbury Park, New Jersey, who is retired, states . . . "Cast your bread upon the sea of steel and it comes back."



WALTER F. AUCH, civil engineer of Easton, Pa. writes . . . "To me this means aiding a basic industry, advancing the welfare and progress of our country."

ARTHUR A. CARR, Ticonderoga, N. Y., farmer, says . . . "I own steel stock and this means that my small savings from agriculture are used as capital in another industry basic to our economy."



Steel company stockholders have had steady returns in the past few years. But dividends have not been large because of the need to use earnings for new plants and improvements. Expansion in the industry has kept pace with the growth of the country.

Today, with less than 7 per cent of the world's population, our country has 53 per cent of the world's steel producing capacity. Stockholders have helped create this industry and this is the way in which our American system works for the benefit of all.

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COLD WORKING SIMPLIFIED

. . . by lead-lubrication process

This deep-drawn part was given five passes without reannealing. It was formerly annealed after each pass

REPEATED annealing operations, with accompanying pickling, rinsing, relubrication and handling are eliminated by a new process used in the manufacture of steel parts requiring a series of severe cold working operations. Developed by Metlab Co., Philadelphia, the method can be used with low carbon steels, alloy steels, stainless steels and other metals. Typical applications are deep drawn parts of many kinds, steel cartridge cases, wire, tubing, etc.

The originally annealed blank, cup, slug, bar or tube is simply coated with pure lead. The lubricating effect is reported to be so remarkable that steel may be given heavy reductions, as many as six or eight, or even more times, without reannealing and without rupture. The trick is in causing lead coating to adhere.

A pure lead coating, according to Metlab metallurgists, retains its lubricating qualities under very severe die pressure and does not strip off; therefore cold reduction can be continued almost indefinitely. The lead can be chemically removed when desired. Cost of preparing and lead coating the blanks is said to be hardly greater than that of the first annealing and pickling operations. Elimination of pickling step by this process is only one of its many advantages. Even though bright annealed, a steel surface usually must be pickled so that lubricants may adhere. This is not necessary with lead coating.

Parts may be moved directly from one press or draw bench to the next without returning them to the annealing and pickling plant. This represents a large saving in production and handling costs and greatly speeds up processing. Also it reduces the inventory of material in process. Decarburization, loss of metal, pitting—common results of repeated annealing—are avoided.

Tubes Welded with Little Flash

WELDS made with a new type tube welder are free from transient zone and discoloration adjacent to the weld. Welding current, weld-time and pressure are combined and synchronized in producing a tube weld which is metallurgically sound. Developed by J. B. Borgadt, Cleveland, the welder has surface-contact electrodes to convey the current across the seam cleft in preformed tubing to fuse the metal.

The electric resistance weld may be a flash weld, butt-weld or modification thereof as desired. It is reported that tubing of a number of materials has been welded with satisfactory results. Carbon steel up to 1045, low alloy steels, stainless and ordinary skelp have been welded.

Phenomena known as intergranular corrosion reportedly has been eliminated in the welding of stainless steel tubing. Controls are a combination of electronic and electromagnetic type and are automatic in operation. Machine may be built in a variety of sizes and combinations for various materials, sizes and rate of production.

Air Polution Still a Problem

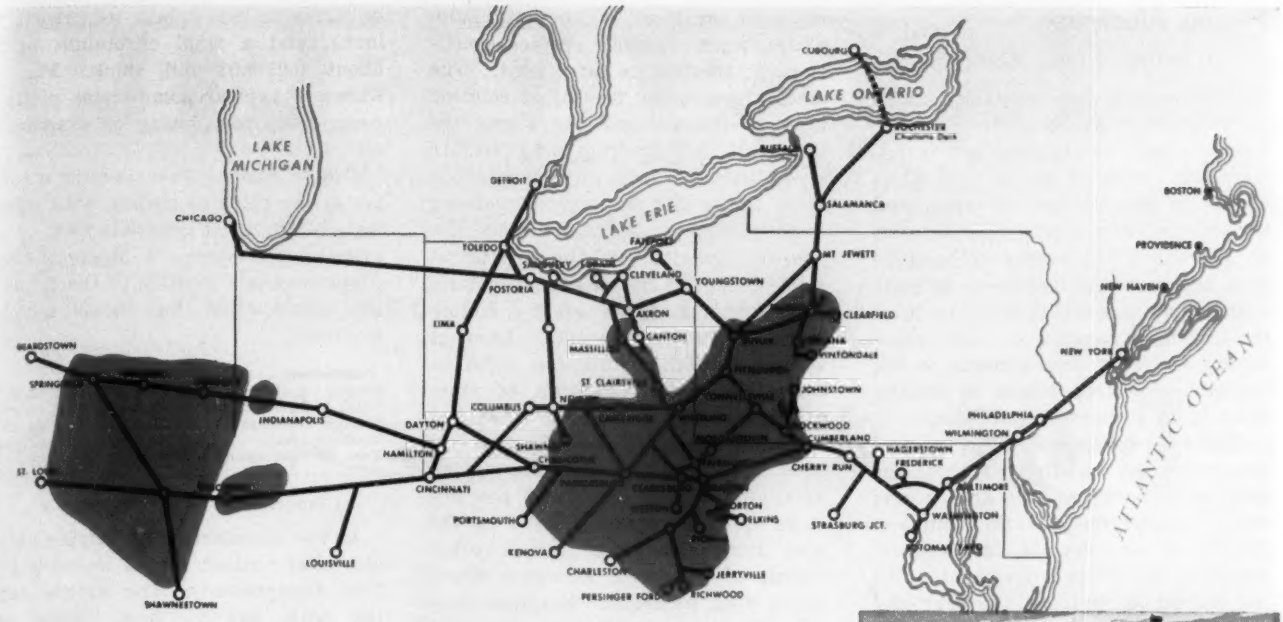
EVEN with the great strides forward by industrial hygiene experts in controlling air pollution in factories and plant areas, there are still many problems to be solved by research. Most significant problems still confronting experts after more than 10 years of study by a committee of the American Standards Association have been outlined by Frank A. Patty of General Motors Research Laboratories.

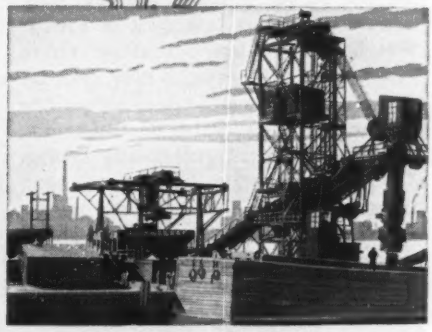
In tackling air contamination, both inside and outside industrial plants, hygienists and toxicologists are confronted with the following problems, he stated: 1. Insufficient data on physiological effects which continued exposure to contaminants has on human beings; 2. lack of standards for permissible concentrations of air contamination which are safe; 3. fear that unnecessarily severe and impractical limits will be set for controlling air contaminants: 4. conflicting viewpoints of experts on the subject, because much is still unknown.

He is an advocate of basis for air pollution control standards. He explains that these might be governed by the physiological responses of man to various air contaminants, sensory or comfort limits, good engineering practice and fire and explosion control. The permissible concentration of material is one factor to be considered when selecting products for use in industry.

High Speed Steel Brochure

A GENERAL purpose steel, called Unicut, is the subject of a brochure offered by Universal-Cyclops Steel Corp., Bridgeville, Pa. An intermediate molybdenum-tungsten, high-speed steel with high carbon and high vanadium, it was formerly called Unibroach. Chemical analysis, heat treatment, a hardening and tempering curve and the range of application in which it is adapted are listed.





HOWLAND HOOK, Staten Island, N. Y.

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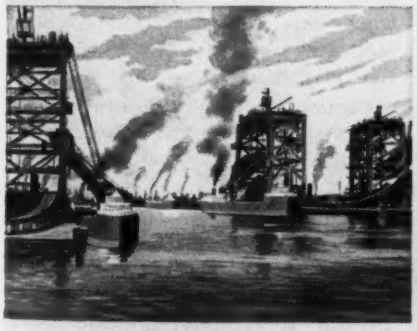
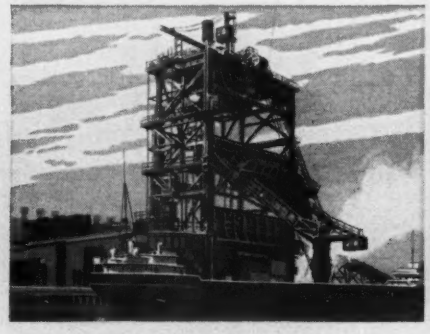
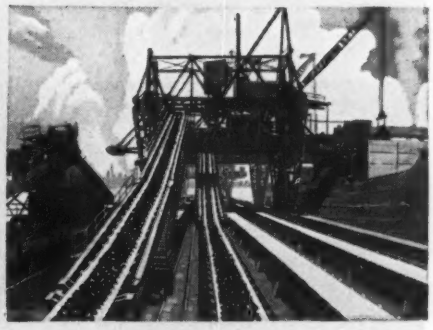
but economical B&O coals are within easy reach of the industries that need them



COAL FACILITIES, Toledo, Ohio



COAL FACILITIES, Lorain, Ohio



CURTIS BAY, Baltimore, Md.

This map should interest you. Note where the vast Bituminous deposits on the Baltimore & Ohio lie —then observe the strategic position of B&O rails serving the heart of industrial America. This is accessibility—the plus that means economy when you buy coals on the B&O!

Through the great B&O ports of Lorain, Toledo, Fairport, and Buffalo on Lake Erie, and Charlotte on Lake Ontario, consumers in all the Great Lakes region and in Canada have access to B&O Bituminous. Terminals accessible to B&O at New York and Philadelphia, as well as B&O's own tidewater terminals at Curtis Bay, Baltimore, and Howland Hook, Staten Island, N. Y., place this coal on the doorsteps of Atlantic Coast consumers.

Because *Bituminous is basic*, B&O has spent more than $80,000,000 in the last three years to improve system-wide facilities for bituminous distribution. Wise consumers with an eye to efficiency, economy, wide variety, and vast reserves, "bank on B&O Bituminous." *Ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE

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Constantly *doing things* — better!

Plating Aluminum

(*Continued from Page 97*)

form oxide film dissolves, and as soon as underlying aluminum is exposed, it also starts to dissolve, and is immediately replaced by an equivalent weight of zinc. When the aluminum surface is completely covered with an extremely thin layer of metallic zinc, action in the treatment solution ceases. As a general rule, most of the reaction appears to take place during the first few seconds of the immersion period, which is usually from ½ to 2 minutes in duration.

Uniform Coatings—With correct procedure, the resulting zinc coatings will be uniform in appearance and firmly adherent to the surface. Weight of zinc deposit has been reported to be of the order of 0.1 to 0.4 mg per sq in. on most wrought aluminum alloys, as is shown in Fig. 2. Weight of coating obtained on a given alloy will depend also on conditioning treatments used before the immersion dip. This is illustrated by data presented graphically in Fig. 3 which shows the effects of using three different conditioning treatments on one type of aluminum sheet.

From the production line standpoint, zinc immersion preplating is less critical than other procedures used for plating on aluminum. As a general rule, good results can be obtained on most of the aluminum alloys when suitable surface conditioning treatments are used. The zincate preplating treatment solution is very viscous and the losses entailed are largely from drag-out. In some respects this is advantageous as it limits the impurities resulting from attack on the aluminum. The specific gravity of the treatment solution should be checked regularly and any loss made up by adding more of the components. Loss of volume caused by drag-out must be corrected by the addition of more solution of the specified composition.

Plating On Pretreated Surface—In production methods for plating on aluminum alloys, the usual practice is to apply a copper strike over the zinc immersion layer before other metals are deposited. However, silver, brass, zinc, nickel, or chromium may be deposited directly on the zinc layer provided the plating procedures are suitable for plating upon zinc. One factor must be taken into consideration, namely, the zinc immersion deposit is extremely thin and any plating treatment which penetrates the zinc layer and attacks the underlying aluminum will result in a poor deposit.

Aluminum Co. of America reports that good results have been obtained with a plating system which comprises a copper strike, a relatively thick nickel plate (0.001-0.002-inch), and a final chromium plate about 0.01-0.02 mil thick. Fig. 5 shows a typical commercial plating room setup for plating on aluminum alloys.

Copper Strike—For applying a copper strike prior to plating with other metals (the most generally used commercial procedure) a Rochelle-type copper cyanide solution of the following composition has been recommended:

Constituent	Concentration
Copper cyanide	41.3 g/L (5.5 oz/gal)
Total sodium cyanide	48.8 g/L (6.5 oz/gal)
Sodium carbonate	30.0 g/L (4.0 oz/gal)
Rochelle salts	60.0 g/L (8.0 oz/gal)
Free sodium cyanide (max.)	3.8 g/L (0.5 oz/gal)
pH	10.2-10.5
Temperature	70° F-100° F

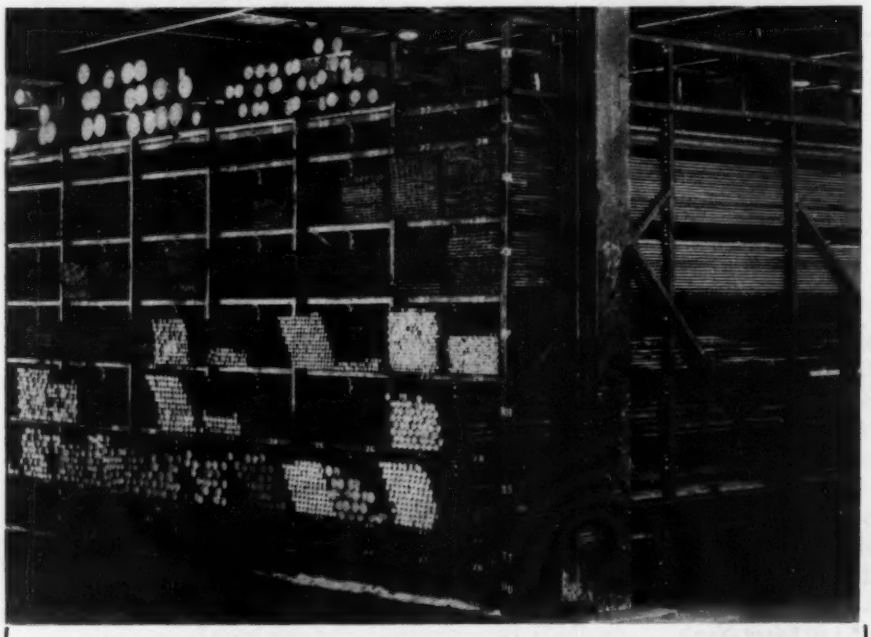
In the operation of the strike bath, electrical contact should be made before immersion of the article into the bath, and for best results, an initial high current density of about 25 amp per sq ft shoud be used to get rapid coverage. After plating for about 2 minutes at this current density, the current should be reduced to about one-half this value, and plating continued for an additional 3 to 5 minutes. One point to keep in mind is that strike solutions of higher pH, such as are sometimes used for other metals, may give blistered deposits on certain aluminum alloys. After this strike, work can be transferred to other standard plating solutions for further plating.

Copper—Heavier deposits of copper may be obtained by extending the plating time in the Rochelle-type copper bath or by use of a commercial high-speed type copper plating bath.

Nickel—Most procedures use a 5-minute or more strike in the recommended Rochelle-type copper solution, followed by a standard commercial nickel plating bath. In some cases, it is possible to nickel plate directly over the zinc immersion treated surface; the bath used should be one suitable for nickel plating over zinc. Any zinc build up in the bath should be removed by low current density electrolysis purification, using about 2-5 amp per sq ft on a corrugated cathode. In case a dull nickel plate is desired for buffing or soldering, the following solution has been recommended:[2]

Nickel sulphate	16 oz/gal
Ammonium chloride	4 oz/gal
Boric acid	3 oz/gal
Sodium sulphate, anhydrous	16 oz/gal
Temperature	70-90° F
Cathode current density	5-15 amp/sq ft
Anodes	rolled, depolarized

It has been reported that the best metal to deposit upon aluminum for soldering is nickel, preferably from



EVERYTHING IN ITS PLACE: Problem of storing and handling round, flat, angle and special shape stocks of steel, brass, aluminum and other metals was solved at plant of Whitin Machine Works, Whitinsville, Mass., by installation of this storage rack. Built by Unistrut Products Co., Chicago, the high strength rack features adjustability and safety. Each 15-inch square pocket has strength and capacity to accommodate 3 tons of 20-foot bar stock, or a total weight of 600 tons per rack

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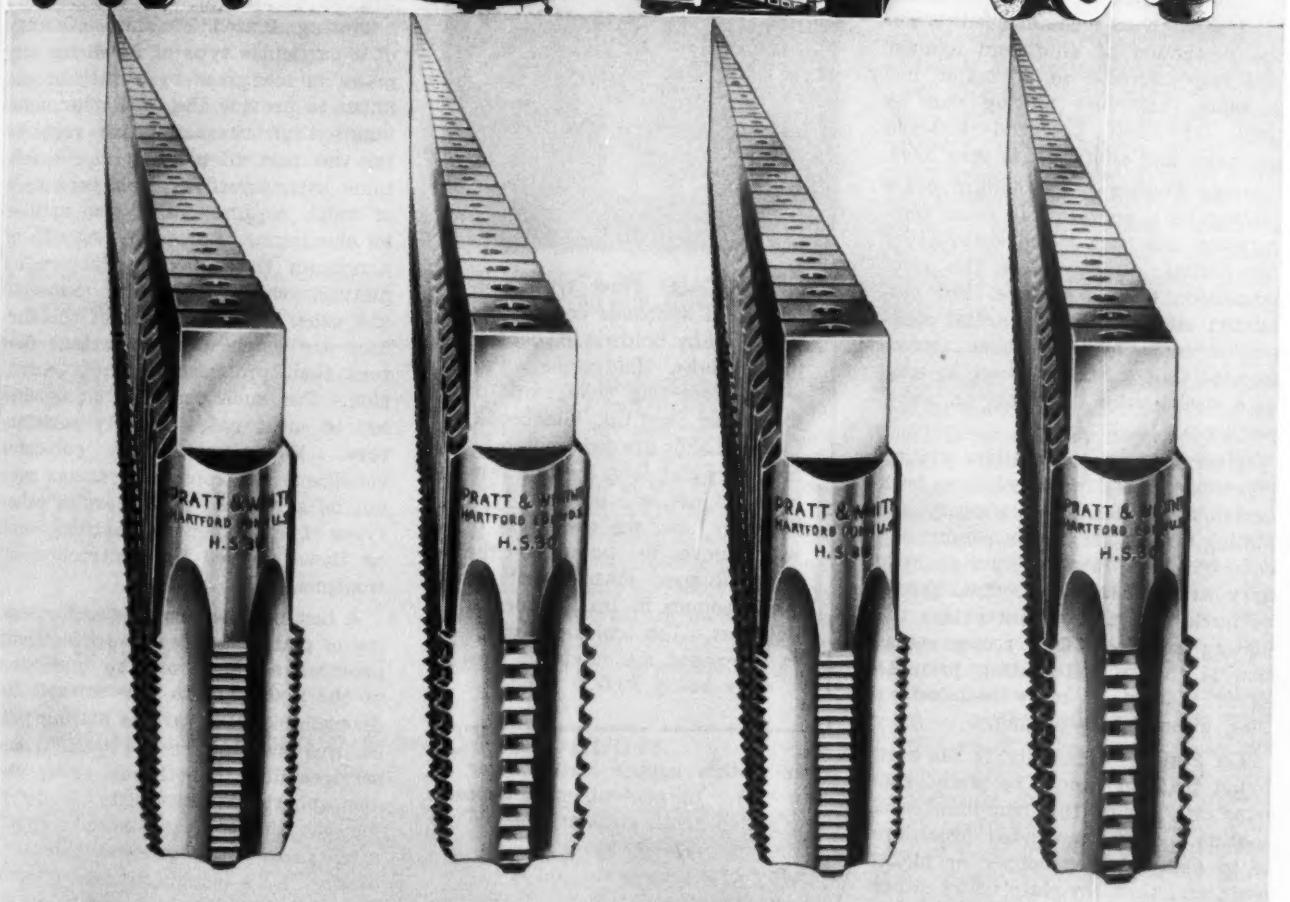

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the sodium sulphate type nickel solution, such as given above. A minimum coating of 0.0001-inch is recommended; copper can be used as a base or soldering but a heavier coating must be applied, usually at least 0.0003-inch. For high temperature resistance of aluminum, direct nickel plating has been recommended as most satisfactory.

Cadmium Plating—Ordinary cadmium solutions are generally considered too alkaline for deposition of cadmium. A strike in a diluted cadmium solution containing 1½ oz per gal of cadmium oxide and 6 to 8 oz per gal of sodium cyanide, for about 2 minutes, prior to regular cadmium plating has been recommended. When the protection of aluminum against salt fog corrosion is of major importance, cadmium plating can be used. The cell potential between cadmium and aluminum is very low[2].

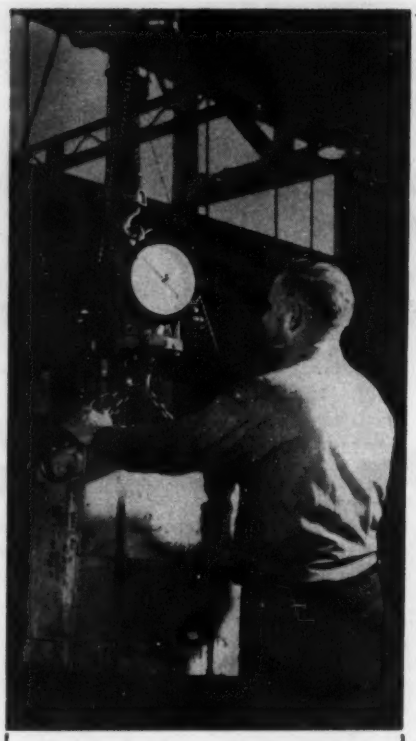
Brass Plating—A standard brass plating bath operated at room temperature has been found satisfactory for plating directly over the zinc-immersion treated surface. For aluminum alloys with substantial magnesium content, it has been recommended that a brass deposit be used as a strike prior to copper or nickel plating.

Silver Plating—The silver plating procedure used for steel has been described as being satisfactory for plating directly on the zinc-immersion coating. This involves two preliminary strikes. Electrical contact should be made before the work enters the plating solution. One recommendation is that nickel plating prior to silver plating is more satisfactory than direct silver plating.

Tin Plating—Generally, it has been found that tin cannot be plated satisfactorily upon the zinc-immersion coating. A recommended procedure is to apply first a copper or nickel plate and then tin plate using either the fluoborate or stannate type solutions. When tin is to be fused, a copper undercoat is preferred.

Gold Plating—Gold should not be deposited directly upon the zinc-immersion film because rapid diffusion will occur. Nickel plate has been recommended as the best base for gold plating.

Chromium Plating—Special techniques are available for chromium plating directly over the zinc-immersion layer; however, most satisfactory results are obtained if chromium plating is done over a preliminary copper or nickel plate. According to recommendations of Aluminum Co. of America, heavy deposits of hard chromium are plated over a thin copper strike layer (5 minutes). In general, such deposits are plated from standard chromium baths at 130-140°F at a current density of 2 amp per sq in.



NEW SCALE: New type self-contained hydraulic crane scale produced by Baldwin in Locomotive Works, Eddystone, Pa., weighs incoming shim stock at Laminated Shim Co., Glenbrook, Conn. Loads are transmitted by an Emery cell, long used on testing machines, to a precision type Bourdon tube, the deflection of which moves the pointer on the dial. Rugged simplicity of the scale permits its use indoors or outdoors. The scales are made in 13 ranges, the maximum capacity being 30,000 pounds

Various combinations of electroplates are feasible for use on aluminum alloys as is indicated by the flow sheet for plating by the zinc-immersion process, Fig. 6. Typical production line operations used for plating on aluminum are listed in the accompanying table.

Rinsing—In all commercial applications of plating on aluminum it is important that the rinses be reasonably clean and thorough to prevent contamination of succeeding operations. A combination of dip and spray rinsing has been found to use the least amount of water and yet produce adequate rinsing. Since the zinc-immersion dip solution is viscous, the subsequent rinsing operation is important. A double rinse is recommended to remove all traces of zincate solution.

Racking—Both aluminum and copper racks, usually coated, can be used in plating on aluminum. When aluminum is used for plating racks, the various electrodeposits may be removed from the racks by the use of nitric acid (conc.), chromium and nickel being the exceptions. These deposits, according to recommendations of Aluminum Co. of America can best be removed by anodic stripping in a 15 per cent (by weight) solution of sulphuric acid. This treatment leaves an oxide film which can be removed by a light etch in a caustic solution.

Testing Plated Finishes—Quality of a particular type of finish for any metal is measured by ability of the finish to provide the particular combination of characteristics required for the part to meet service conditions satisfactorily. This yard-stick of finish requirement is also applied to aluminum. For many articles of aluminum that may be finished by plating, the appearance, adhesion and other characteristics of the surface are much more important factors than protection against corrosion. For such uses, plated finishes are in most cases entirely satisfactory. For certain very corrosive conditions electroplated coatings may not be as protective as certain other types of less expensive coatings, such as those applied by electrochemical treatments.

A test has been suggested for testing of plated samples, which not only provides a check on the adherence of the plate, but is also suitable for determining how various plating procedures may affect the quality and serviceability in both salt spray and atmospheric exposure tests.[9] In carrying out the test, the sample panels after plating are grooved as shown in Fig. 4 by machining two grooves about 1/32-inch deep with a V-shaped threading tool on a shaper in such manner as to form an "X" pattern. These grooves extend through the plating and expose a portion of the aluminum alloy base. Machining of these grooves provides an incidental check on the adhesion of the plate, as lifting of the plate at points of intersection and along the sides of the grooves will occur on those samples with very poor adhesion, during this grooving operation.

When specimens of this type are subjected to salt spray, any plating that is inadequate or that has not been satisfactorily applied will soon develop blisters and will lift along the sides of the grooves. An example

of the type of result obtained in salt spray tests with these grooved samples is illustrated in Fig. 4, referred to above, which shows two plated 24S-T samples after 300 hours in the salt spray test in Aluminum Co. of America laboratories.

It was reported[9] that both of these samples were prepared by the zinc-immersion procedure and had coatings of 0.0003-inch copper, 0.002-inch nickel, and 0.00002-inch chromium, the nickel being applied using two different commercial nickel plating solutions. As can be seen from the corrosion test panels, one sample developed stress cracks early in the test and corrosion started at these cracks. The other sample showed only a small amount of lifting along the grooves. Corrosion tests have also shown that about 0.02-mil chromium coating applied over nickel is effective in reducing galvanic action between any exposed aluminum and the nickel plate.

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Fittings Reduce Costs

RADIANT heating installation costs may be reduced with the use of Redi-Bend line of pipe fittings in three types developed by Capitol Mfg. & Supply Co., Columbus, O. Types available are: Weld type, with upset ends, ready for welding; coupled-type, threaded and furnished with two recessed, taper-tapped couplings; and sleeve-type, with plain ends, supplied with two welding sleeves. While all of the above are available 180 degrees bends, 90 and 45 degree bends are made in the coupled-type and sleeve-type only.

Radii and centers furnished in Redi-Bends are the result of a survey of architects, contractors and engineers by the company. Although they will not need the radius requirements of every radiant heat job, every job can be designed to conform to the standards established, thereby effecting substantial savings. Fittings may be furnished in steel, wrought iron, extra heavy steel or extra heavy wrought iron.

Lists 1400 Films

IN a 100-page pamphlet available from National Metal Trades Association, are listed 1400 motion picture and slide film training aids. Distributed to member concerns, the bibliography describes each film as to contents, running time, availability and whether black-and-white or color, sound or silent. A title index and subject groupings are included Copies are available from the association at 122 S. Michigan Ave., Chicago.

POWER DRIVEN BRUSHES

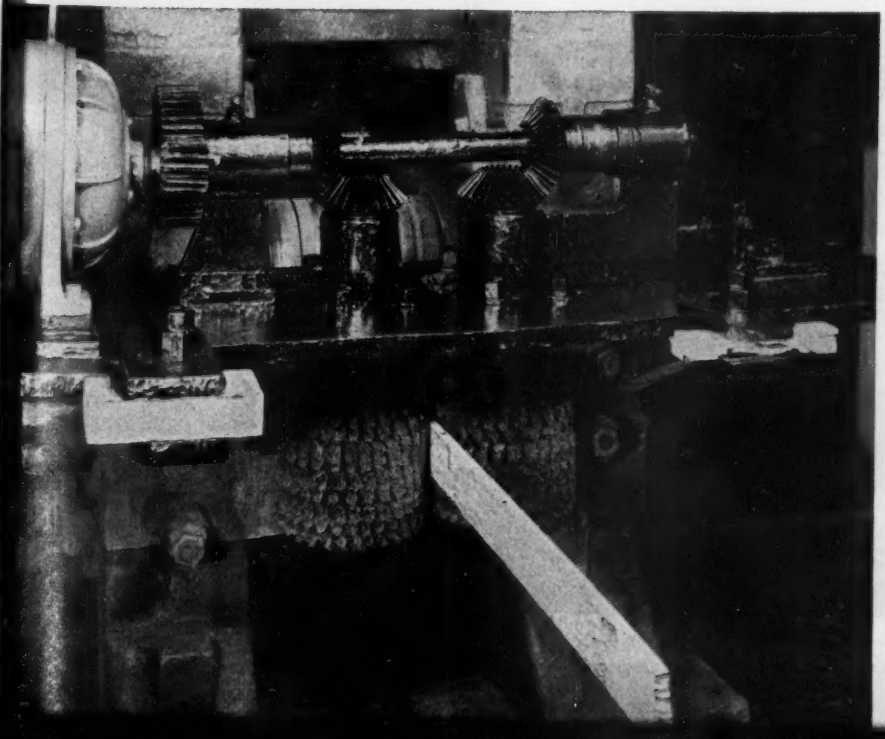
Remove Mill Scale from Steel Shapes

SECONDARY mill scale, developed during the hot mill rolling operation, comprises about one-half of 1 per cent of the steel weight. An additional 1 per cent of the weight is lost to primary mill scale which results from the steel being heated in furnaces prior to the rolling operations. This scale usually is removed by hydraulic water pressure in the rolling mill line, but the secondary scale is now being removed mechanically.

A midwest steel producer developed special machinery whereby secondary scale is removed by disk-center wire wheel brushes, made by Osborn Mfg. Co. of Cleveland. These brushes are driven by a 2 hp motor running at about 1400 rpm, with a 3 to 1 gear reduction. Steel shapes from 1¼ to 4½ inches wide come through the mill and are run through the wire brushing machine against the direction of brush rotation.

This method of scale removal is used on both 8 and 10-inch bar mills in this plant, although not all of the mill's material is so processed. Approximately 19 per cent of the 8-inch mill's material is brushed, as contrasted to 36 per cent on the 10-inch mill. Brush wear is offset by moving one of the shafts closer to the other.

Steel travels from 800 to 1200 fpm on the smaller size mill and from 700 to 1000 fpm on the 10-inch mill. Brushes operate in a water spray to keep them cool and maintain their efficiency. Steel leaving the furnace has a temperature of 2050 to 2200° F and from 1800 to 1925° F while it is being finished and run through the brushes which are used after the seventh and ninth stands of the 10-stand bar mill.



Power brushing installation for removal of secondary mill scale from steel shapes. Brushes rotate against direction of steel shape travel

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NUMBER 16 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

IRON ORE

Its Mining, Beneficiation and Reserves

All factors considered, it seems evident that before very long a supplemental new ore supply must be provided if our nation is to produce steel at the rates now estimated by some economists as necessary to meet our future requirements. We have no ore shortage—the only question is from which of several sources can we procure it most economically

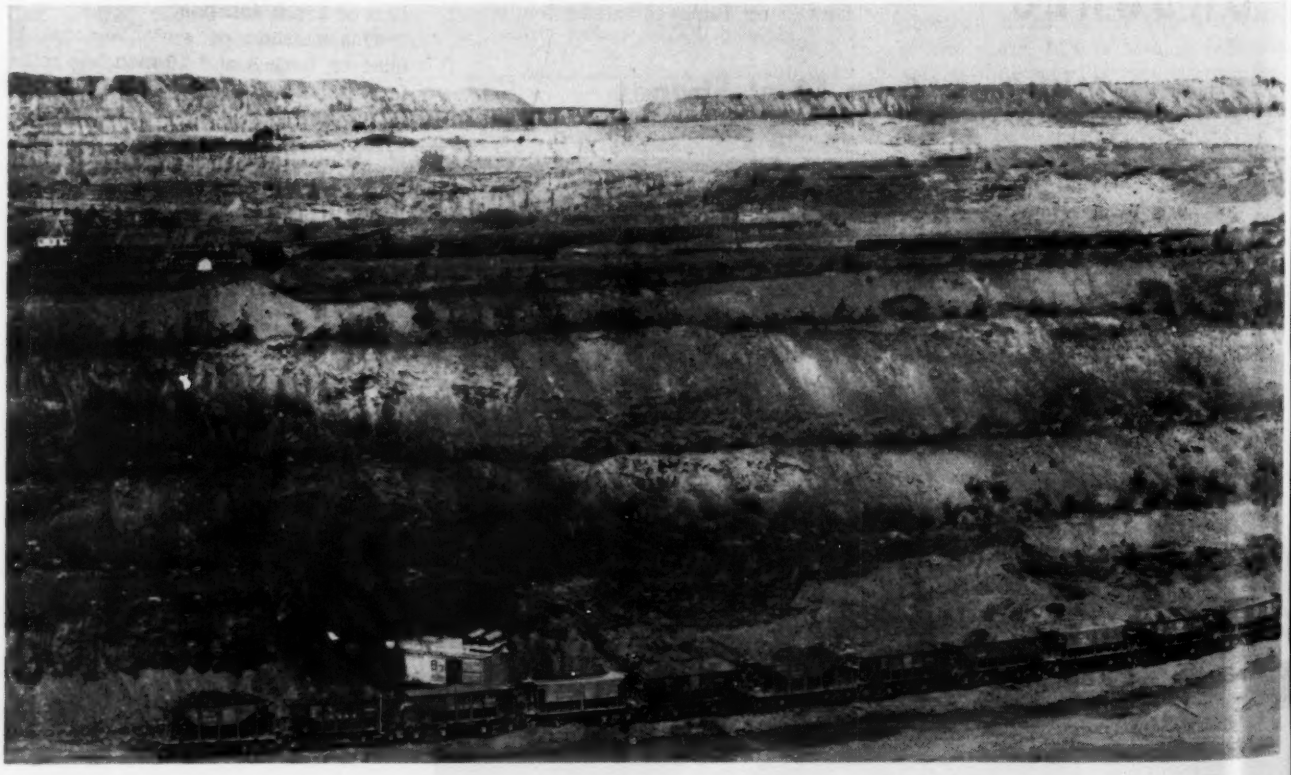
By E. W. DAVIS
Director, Mines Experiment Station
University of Minnesota
Minneapolis

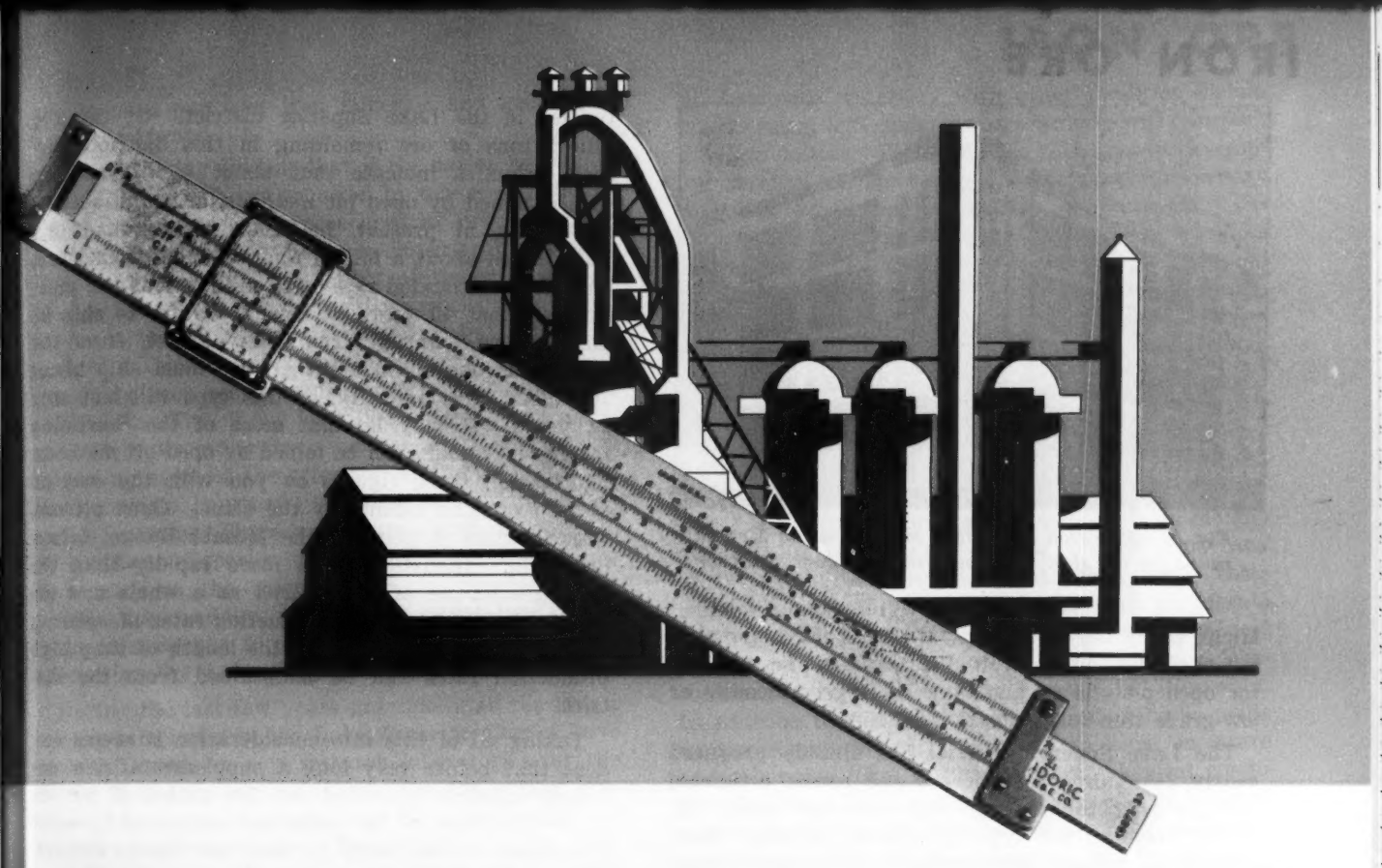
PART III

IT has been customary for each generation to use the best of the natural resources at hand leaving inferior materials for future use, and the present generation is certainly no exception as far as iron ore is concerned. Discovery of the great Mesabi range open-pit ore mines made possible the organization of our great steel companies and steel they produced effected the great industrial expansion of the last 40 years which enabled us to successfully wage two great wars. However, the end of this treasure is now in sight and it is time to consider the future.

In the past 50 years we have used 1½ billion tons of ore from the Mesabi—most of it from open-pits. So far as is known, this is—or was—the only open-pit, direct-shipping ore of any considerable quantity in the United States available to our existing Great Lakes steel industry. New ore discoveries will be made in the Lake Superior district but we need not expect to find any more Hull-Rust pits. Geologists and engineers have studied, and are still exploring in great detail, the territory surrounding the Great Lakes. New iron mineral-containing areas are being discovered and reported in Minnesota and

Fig. 10—View of the Hull-Rust open-pit iron ore mine on the Mesabi range which has been called the "Grand Canyon of Minnesota"





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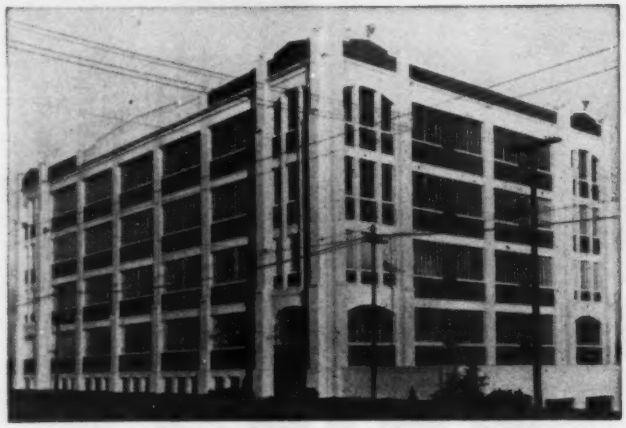


Fig. 11—Research laboratory located on the Mesabi range for the study of lower grade ore concentration

Michigan by use of the new air-borne magnetometer, but these findings will, in all probability, be too deep for open pit mining and may be largely taconite or low-grade iron formations.

The Lake Superior district has already produced nearly 2½ billion tons of ore and recent estimates indicate that the district still contains about 1¾ billion tons of the type now being mined. Some economists believe that within a few years United States ore consumption will reach 120 million tons annually, of which about 95 million tons must come from the Lake Superior district. Dividing 1¾ billion by 95 million would indicate that this ore will last about 18 years. While this mathematics is correct the answer is entirely misleading because, in the first place, no mining district can produce at a maximum rate right up to the last year of its life and, in the second place, practically all of the ore is owned or controlled by various steel companies, the holdings of which are not in proportion to their annual requirements. The various companies thus will exhaust their reserves at different times. From this alone it is obvious that the production of ores of the types now being shipped from the Lake Superior district will continue for many years, but at a gradually declining rate.

There is another angle to future Lake Superior ore production that must not be overlooked. In 1942—the year of highest shipping rate—more than 93 million tons of ore were shipped from this district, over 70 million tons of which came from open pit mines and only 23 million tons from underground properties. It takes a big, well-equipped and well-developed underground mine to produce one million tons of ore annually. Only a few mines in the Lake Superior district have ever done this. Many of the largest and best underground mines were opened first and most of those remaining are smaller and more difficult to operate. Unless an underground property contains 10 million tons of ore it is hardly conceivable that production can exceed one million tons annually. All of this leads to the conclusion that an annual production of 25 million tons of underground ore in the Lake Superior district is just about all that should be expected.

Now if this estimate is accepted it is possible to get a little better picture of future iron mining activities in the Lake Superior district. Of the 1¾ billion tons of ore remaining in this district, current estimates indicate that about ¾ billion tons can be mined by open pit methods, although a third of this is, at present, listed as underground ore. This leaves about a billion tons of underground ore, and at the estimated rate of 25 million tons per year, this will last 40 years. Then, if we are to ship 95 million tons annually from this district, from the ¾ billion tons of open pit ore we must ship about 70 million tons annually, so this type will last only 11 years. It may be that more of the remaining reserve eventually can be mined by open-pit methods, but change these figures as you will, the over-all picture remains essentially the same. Open pit ore, which occurs largely on the Mesabi Range, is approaching exhaustion much more rapidly than the underground ore of the district as a whole and the length of time that high production rates of open pit ore can continue will govern the length of time high production rates can be maintained from the district.

Taking all of this into consideration it seems evident that before very long a supplemental new ore supply must be provided for the nation if we are to produce steel at the rates now estimated by some economists as necessary to meet our future requirements. There is no shortage of ore in the Western hemisphere—the only question being from which of several sources it can be procured for our use most economically. In attempting to answer this question there are several points to be considered. In the first place, is the estimate of 120 million tons as our future annual requirement realistic?

Detailed studies have been made correlating steel production with national employment, and on this basis some economists have reached the conclusion that steel production must exceed 120 million tons per year by 1954 in order to keep industry supplied with the necessary steel for the maintenance of full employment. Whether or not these conclusions are accepted, doubtless the safe course for industry to pursue is to accept the figure of 120 million tons of ore by 1954 as a possibility and see what must be done in order to meet this requirement.

The next question that arises has to do with national policies. Will this nation be satisfied to depend, to any considerable extent, upon imported iron ore? Accepting the statement that all the iron ore districts in the United States except the Mesabi doubtless can maintain production at the required rates for long periods of years and that Mesabi shipments must be supplemented soon at a gradually increasing rate, how much of this supplementary ore should we plan to import and how much should we plan to secure by beneficiating the almost unlimited supply of taconite and iron-formation in the Lake Superior district? This is a question of far-reaching national importance. From the standpoint of national defense, perhaps we should plan to supply all of our future ore requirements from within our own country. From the standpoint of the good neighbor policy perhaps we should buy all of the iron ore possible from foreign producers. From the standpoint of conserving our own resources perhaps we

should save our own iron minerals and get all we can from abroad.

It is becoming evident that if the nation so wishes, all additional iron ore required by our steel industry for years to come can be secured by processing the iron-bearing rocks of the Lake Superior iron-formation. Engineers and geologists of the mining companies have been studying these rocks intensively for only the past half dozen years, but already a quarter-million-ton pilot plant is in operation, actually producing high-grade furnace ore from one type of this rock. This type is called magnetic taconite, and while its occurrence on the Mesabi range is attracting most of the attention at the present time, it also exists in great quantities in both Michigan and Wisconsin. There are several kinds of taconite in the Lake Superior area, but progress that has been made in the treatment of the magnetic type justifies us in adding at least two billion tons of ore from this source to our available reserve figures concerning the Lake Superior district.

During the last few years practically all the larger mining companies in the Lake Superior district have installed extensive new research laboratories for the study of beneficiation methods for converting low-grade ore materials reposing in their properties into high-grade furnace ore. These organizations give every indication that they are preparing to take care of their future ore requirements by processing the low-grade ore materials in the districts in which they are now operating. However, one question that needs to be answered relates to the quantity of ore that will be required from this source in the near future.

At the present time plans are being made for two large magnetic taconite processing developments on the Mesabi range which, in their final expanded forms, can provide 20 million tons of high-grade furnace ore per year. These are expensive plants, estimates indicating that the investment cost will be around $15 per ton of annual capacity. From this it is seen that in order to make 20 million tons of taconite concentrate available annually, investments of something like 300 million dollars must be made. Once the investments are made, there is sufficient taconite available to maintain this rate of production for 56 years or more, but obviously the capital required to start production is very large. Other projects are being studied, looking toward the production of high-grade iron ore from the iron formation in other Lake Superior districts but, in all probability, the first costs of any such plants will not be much different from those on the Mesabi. Before making these great investments the mining companies, naturally, must know that the ore they produce will be needed and that no other source of supply available to them is cheaper, both from the standpoint of investment and production costs.

It might seem that a much smaller investment would be required to bring foreign ores into this country. In a recent government report it is stated that a new deep St. Lawrence waterway will be required if any considerable amount of Labrador or any other foreign ore is to be brought to our present steel plants. It is currently stated that the deep St. Lawrence waterway with other facilities including deepened lake channels and harbors will cost over a billion dollars. In addition to this, cost of developing foreign ore sources and building the necessary railroads, ore-loading docks and other necessary facilities will be no small item. In the Lake Superior district, most of the initial development has been done and communities for employees, railroads and docks already are available. Therefore, it appears that foreign ores probably will have no advantage regarding the amount of capital required.

From the standpoint of operating costs, less definite information is available. Companies now investigating the processing of Lake Superior iron-formation believe that taconite concentrate can be produced and delivered to existing steel plants as cheaply per unit of iron as ore can be secured from any other source. Estimates indicate that while costs will be considerably higher than for open pit Mesabi ores, they will be not far out of line with the cost of underground ores produced in Michigan and Wisconsin and on the Vermilion range in Minnesota. In addition to this, the shipping product to be made by processing taconite will be free from moisture and otherwise ideal in chemical and physical condition for blast furnace smelting. Hence it is believed that material savings can be made at the blast furnace and steel plants in converting this product into iron and steel.

The processing of Lake Superior iron-formation is not greatly different from processing methods used in the copper industry. Practically all copper we use today is produced from very low-grade copper ore, still the price of copper today is no higher than it was 40 years ago when only high-grade copper ore was smelted. In general, there is reason to believe that it will not be necessary to raise the price of steel to the ultimate consumer by any considerable amount, even if a major portion of our future ore supply is to come from taconite.

Summarizing the situation in the Lake Superior region it may be stated that on the basis of current knowledge of reserves there is sufficient ore of the types now being mined to maintain production at

Fig. 12—View at a New York state mine showing hoist house, crushing and cobbing plants, schools, club building, office and hospital

REPRINTS AVAILABLE

REPRINTS of previous articles in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. Subjects covered over the past few months include blast furnace, open hearth and electric furnace practice, tool steels, roll design, coke production, plates, sheets and strip, tin plate, structurals and rails, scrap bessemer steel, butt and lap weld pipe, seamless tubing and stainless steel.

high rates for perhaps as long as 10 years, but actually, some of the mining companies will be unable to maintain their required rates of production that long. Therefore, changes of radical importance must occur in the United States iron ore industry within the next few years to avert an ore shortage by a number of steel companies, especially if steel production is to be increased. These changes may include: (1) The erection of large plants to process taconite and other lean ore materials; (2) provision of facilities for the delivery to existing steel plants of 10 to 20 million tons of imported ore annually; (3) development of new and revolutionary methods for the rapid mining of ores of the Lake Superior district now listed for underground mining; and (4) movement of some of our present steel industry to the coast or the construction of new steelmaking facilities where foreign ores are more readily available.

Most informed persons do not give serious consideration to the possible removal of existing steel plants, although construction of additional steelmaking facilities on the eastern and southern seaboards may be anticipated when increased capacity really is demanded. Progress on the third item above is very questionable, but various units of the steel industry are going forward actively on the first two.

It is clearly evident that to provide an adequate future iron ore supply for this nation will require great investments of new capital. The question that is now being studied so carefully is how and where this capital can best be invested. The decisions must be made soon—some of them certainly within the next 5 years.

Stainless Hose is Flexible

CORROSION resistance in sulphonation and other processes which cause the formation of sulphuric, formic or acetic acids and other highly corrosive agents is provided by a flexible stainless steel hose made of stainless No. 20 by Alloy Tube Division of Carpenter Steel Co., Union, N. J. Previously available only in such conventional analyses such as types 304, 316 and 347, the hose has a size range of from about 1 to 2⅝ inches ID, in various gages.

Hose is expected to be useful where full erosion resistance must be combined with flexibility, on equipment which vibrates, or which must be moved from time to time. Standard pipe size nipples and other fittings can be welded to the end of the hose or the hose end can be provided in nonflexible standard tube sizes for use with flanges.

Package Serves as Wire Spool

A SOLID fiber box, used for packaging Silverstitch stitching wire at Acme Steel Co., Chicago, serves as a spool on which the wire is wound as well as a shipping container. When the customer uses the wire, the package reverts to its initial use as a spool. Wire is machine wound on the spool prior to the addition of a cover which is fitted around the outside circumference of the spool for completion of the package.

Designed and manufactured by Gaylord Container Corp. of St. Louis, the spool itself is made of five pieces of solid fibre. Fifty pounds of stitching wire is wound on the spool. The enclosure forms a complete seal which protects the wire from weather, dust or other damage during shipment and in storage.

Welding Repairs Damaged Truck

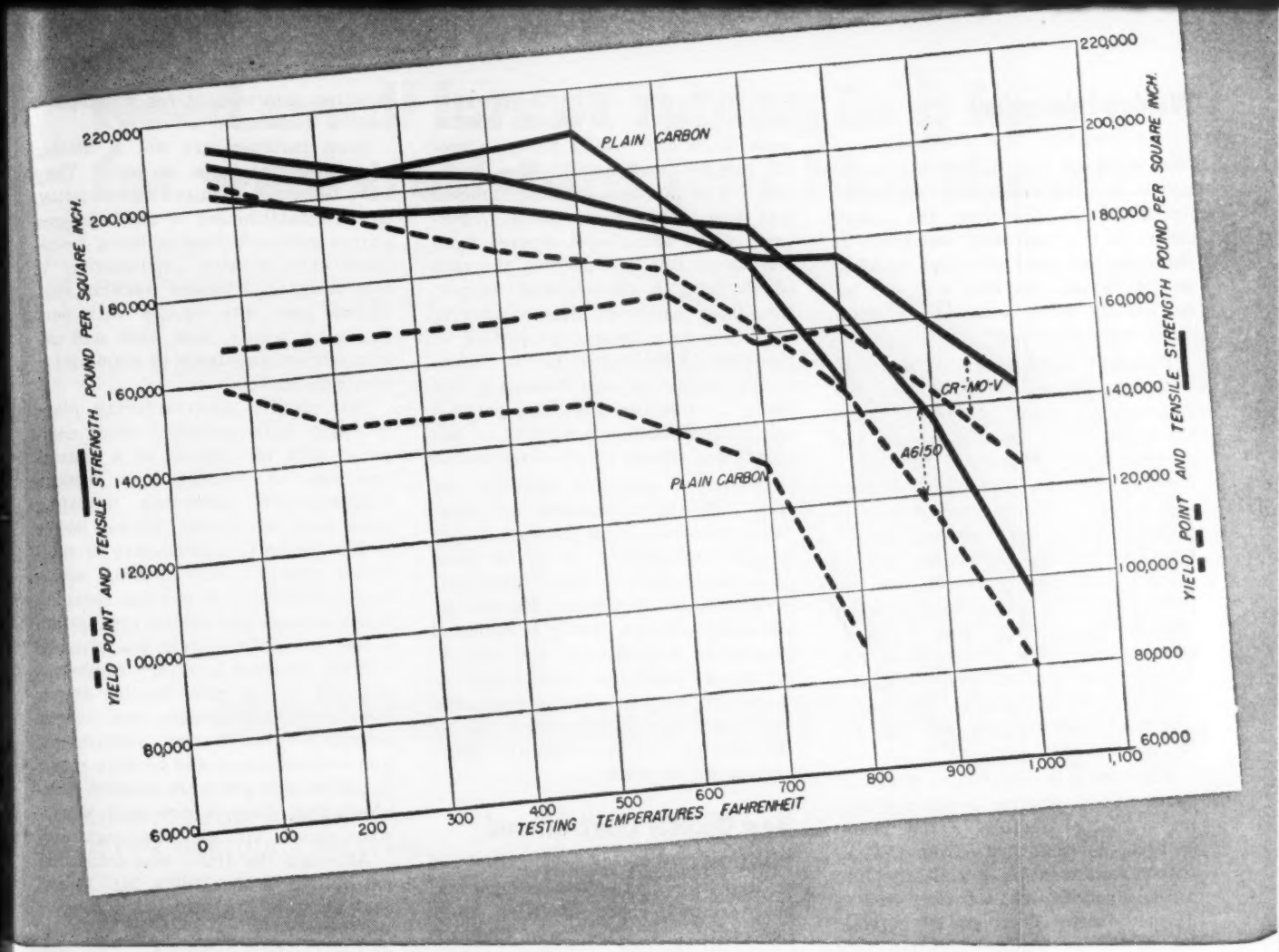
WELDING was successfully employed by Elwell-Parker Electric Co., of Cleveland in the repair of a 1935 model electric power-truck diehandler used by an automobile body stamping plant. Although its rated capacity was 50,000 pounds, the truck was called upon in an emergency to transport a 125,000-pound load on its platform in a lowered, stationary position.

The occasion arose in this plant to move a 250,000-pound stamping press. Neither the truck nor an overhead crane in the plant were equal to the job, but it was decided to use both, each sharing half the load with the truck serving mainly as wheels for one end of the press and the crane lifting and manuvering the other end. With one end of the press on the truck platform, the crane attempted to lift its end, but some part of its mechanism failed to function and the press dropped, with a resulting severe jolt for the truck then bearing the greater part of the heavy load.

This heavy jolt on the outer end of the platform caused the arms which support the platform to be broken off at their elbows. These arms are chrome molybdenum alloy steel castings, 13 inches wide, 3½ inches thick, and weighing 1750 pounds each. To make new castings and rebuild the platform would have taken 3 to 4 months, it was estimated. Even though the cost factor alone was thought to be prohibitive, the time factor alone ruled out this method of repair.

With welding seeming to be the only alternative, the truck was sent to the plant of the manufacturer. Certain retaining and connecting plates which had been broken were replaced and clamps and bracing were employed to hold the entire platform assembly together. The edges of the fracture were beveled down to 45 degree angles to make opposing V's, their points being ⅛-inch apart. Forty pounds of weld metal bearing the following composition was deposited in welding each fracture: Carbon, 0.30 to 0.40; manganese, 1.0 to 1.25; molybdenum, 0.30 to 0.40. Maximum thickness of the welded area was 4 inches.

As alignment was essential for subsequent operation of the elevating mechanism, the welding was carefully done to distribute heat and metal. Two welders were employed, one operating on each side of an arm. Two beads were welded along one side of the open V-shaped cut, then two along the other, each welder operating alternately, so that there could be no severe drop in temperatures to cause warpage in the finished work. A series of loading and operational tests at the factory demonstrated that the method was entirely successful.



HIGH TEMPERATURE PROPERTIES

of Cr-V and Cr-Mo-V Spring Steels

SPRINGS FOR SERVICE at elevated temperatures require steels which resist softening and lowering of the yield point. Unless hardness and yield strength are stabilized by correct alloy additions to the steel, these properties deteriorate rapidly as the temperature is raised.

The chart above shows the yield point and tensile strength of three types of spring steel at elevated temperatures determined by standard short-time tension tests.

Springs of plain carbon steel are sometimes used at moderately elevated temperatures, although their lower yield values prevent them from giving service as satisfactory as that of the alloy spring steels.

Chromium-vanadium steel springs, such as AISI 6150, give better service at ordinary temperatures because of the higher yield point. In addition, they may be used at operating temperatures up to about 700° or 750° F because they retain high yield point values as the temperature is increased.

Chromium-molybdenum-vanadium steel was especially designed for springs operating at temperatures in excess of 750° F. It can be used for springs operating at temperatures as high as 850° F or even higher under some conditions. At 800° F, the yield point of this steel is still greater than that of plain carbon steel at room temperature.

If you have a problem in spring applications at elevated temperatures, our metallurgical engineers will be glad to help you solve it.

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Welded Fabrications

(*Concluded from Page 93*)

from it which caused rapid deterioration of the main tank wall above the liquid level. Therefore the upper course of the tank shell was made of stainless-clad steel with the cladding on the inside. In this way, all requirements were satisfied at minimum fabrication cost.

Principal components of a somewhat conventional type of tank for sulphuric anodizing of aluminum are the main tank, exhaust casing and cooling coils. Many of these have been fabricated of plain carbon steel, lead lined. This is one of several identical tanks made for installation below floor level, so that the outside of the tank is exposed to the sulphuric solution and it is impracticable to maintain any kind of protective coating. The answer here was to build the tank of Monel-clad steel with the cladding outside, line the inside with lead and use lead pipe for the cooling coils.

The casing is designed so it can be removed for cleaning or other servicing. Another feature of the casing is that the condensate from the exhaust vapors drips harmlessly into a lead-lined trough, where it can be drained away. There are no crevices where it can lodge. The ten pipe coils are connected to fabricated Monel headers and each coil traverses the length of the tank five times.

Lead Welding—All the lining and coil work is done in the lead shop by specialists in lead welding. Standard procedure is to use three weld layers on lead sheet up to ⅛-inch thick and on up to six layers for thicknesses from 11/32 to 7/16-inch, giving a weld area of three to four times the base metal thickness. Lining a tank means covering all interior parts as inlets, outlets, shelves, dams and partitions. In the anodizing tanks just described a motor-driven impeller, mounted on a vertical shaft, is used to keep the electrolyte circulating. Fig. 3 shows the lead chamber in which the impeller is suspended. It is fitted with a girdle of lead-covered angle iron. Lead is a very useful metal, especially when sulphuric solutions and fumes are encountered, and a surprising number of things can be done with it.

An oven retort made of 3/16-inch Everdur plate is one component of a large installation of mill equipment for processing metal rounds. The raised portion is a water cooling jacket. The stiffeners are 3 x 3 x ¼-inch Everdur angles. All plate seams were double welded. Intermittent welds were sufficient for joining stiffeners to the shell. Continuous welds here would serve no useful purpose and would cause buckling. The inert-arc welding process was used throughout. Most important of the advantages secured from the use of this process was the ease of obtaining a smooth weld deposit, free from porosities, thus developing the corrosion-resistant properties of the alloy to the fullest extent. Also, by concentrating and localizing the heat, it made rapid welding possible and minimized the possibility of adverse heat effects on the base metal.

These few examples illustrate the fact that the availability of semi-precious metals in all common shapes and the weldability of all of them give the designer of plant equipment great freedom of design. He can lay the equipment out exactly to meet his production requirements and the experienced fabricator can build it. Costs are not necessarily high and are more than compensated for by the ultimate savings when the fabrications go to work.

New Decimal Chart Offered

THOUGHT to be the first of its kind created by a professional designer, a new decimal chart available from Central Steel & Wire Co. of Chicago, incorporates high visibility colors, "pointer" fractions and high-low divisions. The 64ths and 32nds are featured in the pointer pattern on high visibility yellow background with blue figures. Chart is divided down the middle, with the decimal equivalent to either side. Fractions are converted to decimals by reading from the outside of the chart to the center.

For wall use, the chart measures 25 x 38 inches. Decimals appear in white on deep blue. Sixteenths appear in a white panel and other fractions are blended into a neutral grey background. Copies of the chart are available from the company, 3020 W. 51st St., Chicago 32, Ill.

Welfare Restyles Plants

GROWING concern in industry for employee welfare and the improvement of employee working conditions is providing a new impetus to the architectural and engineering restyling of America's industrial plant, it was pointed out by E. P. Abbott, vice-president of Wigton-Abbott Corp., Plainfield, N. J., engineers and contractors. There is hardly a plant today that can consider itself modern which does not include extensive recreational and restaurant facilities as part of its program to create better working environment for its employees, he declared.

Such facilities are not a matter of managerial taste or whim. They have become recognized as necessities in the establishment of employer-employee good will that is being translated into greater productivity, it was asserted. Pleasant working conditions now rank equally with pensions, job tenure, sick leave and unemployment assistance in maintaining employee morale.

The modern manufacturing plant is today unrecognizable when compared with the factory of a generation ago. Air conditioning, modern fully-equipped cafeterias providing good food at modest prices, larger window areas to permit entry of maximum sunlight into working areas, use of pleasant colors, noise reducing walls, ceilings and floors, appropriate music or readings over plant public address systems to divert employees engaged in the more routine activities, more comfortable rest rooms, lounges, libraries and auditoriums, and various indoor and outdoor sports facilities have given the modern manufacturing plant a new and wholesome aspect, Mr. Abbott brought out.

Although the trend was somewhat perceptible in the 1930's, Mr. Abbott said, it took the war years to give the movement its greatest impetus. The suddenly increased need for production facilities during the war brought with it the problem of feeding and entertaining the greatest work force in the history of the country. The lessons during the period concerning the direct effect of employee morale on production are not being forgotten in the construction of postwar plants, he concluded.

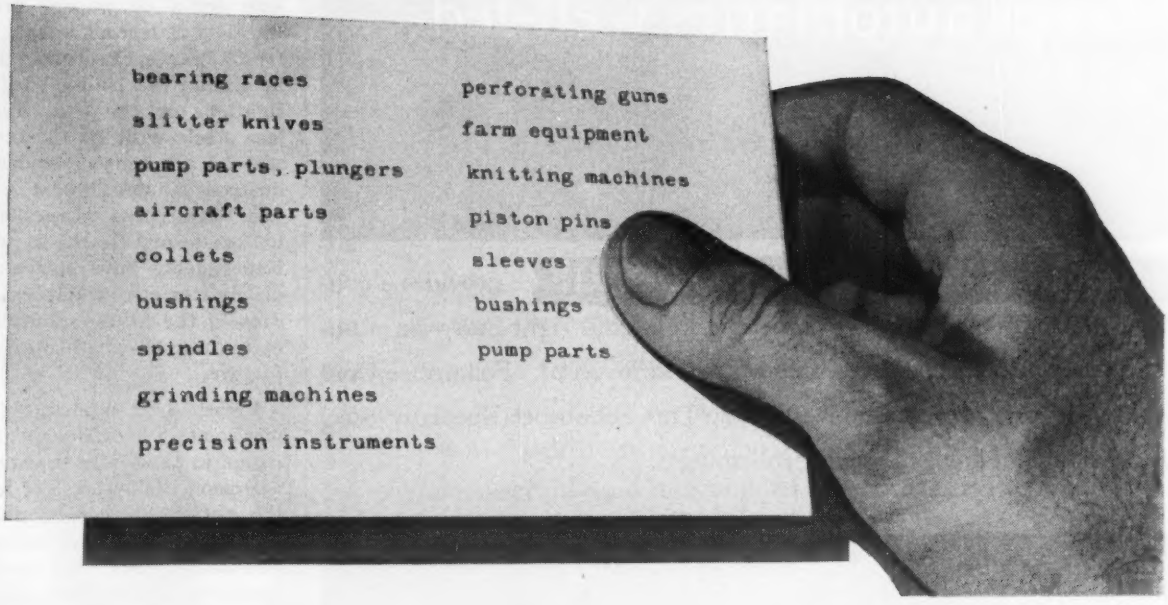
Booklet Teaches Worker To Lift

WORKERS must be trained in safe lifting in order to not suffer physical disabilities. Bearing this in mind, the Bureau of Labor Standards of the Department of Labor, Washington 25, D. C., is publishing a booklet "Teach Them to Lift." Methods are suggested for preventing the types of injuries caused by improper lifting habits and eight basic questions are given as a guide to the supervisor in teaching workers.

Excuse the Blush

ALTHOUGH we realize many readers have already detected the typographical error in the temperature quotation in the short announcement, "Higher Temperature Alloy", P. 109, Nov. 7 issue, just for the record we do want to point out that the compound withstands temperatures up to 6000° F.

Need small lots of tubing in a hurry for wear-resistant jobs like these?



AVAILABLE FROM WAREHOUSE STOCK FOR IMMEDIATE DELIVERY.

52100 TUBING
101 Stock sizes

High Carbon Chrome steel—a direct quenching steel which gives through hardness in moderate sections.

"NICKEL-MOLY" TUBING
52 Stock sizes

Low Carbon Nickel-Moly steel—a carburizing steel which gives high surface hardness with a tough core.

THESE two grades of Timken® tubing that will do 90% of your hollow parts jobs!

Timken 52100 is a high carbon steel that can be heat treated to file hardness and tempered back to any desired point. In moderate sections it is through-hardening. It resists wear and frequently can be used in place of more expensive steels.

"Nickel-moly" is a low carbon, carburizing steel that develops high case hardness and a tough inner core. This gives it exceptional stamina and shock absorbing qualities.

These two general purpose Timken steels are now being successfully used for the parts listed above and in many other applications where hardness and wear resistance are a problem. 52100 is available in 101 sizes, from 1″ to 10½″ O. D. "Nickel-moly" is available in 52 sizes ranging from 1.389″ to 10.223″ O. D. With both of these Timken steels you're sure of uniformity from tube to tube and order to order.

Write for a copy of our stock lists or send your order today to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

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FOLLANSBEE STEEL CORPORATION

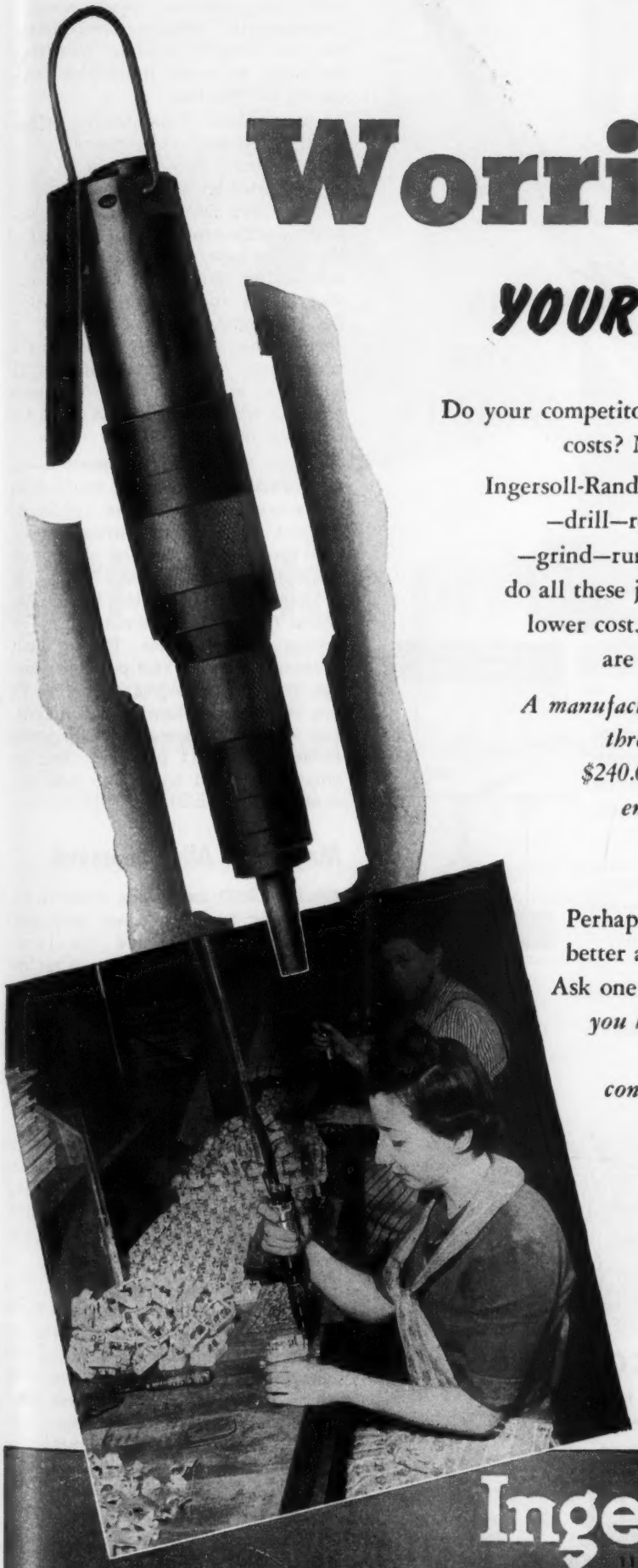
British, French Hear Papers

JOINT meeting of Societe Francaise De Metallurgie and Institute of Metals of France and Great Britain, respectively, held in Paris in October saw some 60 papers presented in the field of ferrous metals by authors from France, Belgium, the Netherlands and the United States. Investigations on the corrosion of stainless steels with 18/10 chrome nickel and 2.5 per cent molybdenum by industrial sulphuric acid have shown wide differences in service and even in laboratory tests, it was stated. Experiments have shown that these differences are largely due to impurities in the acids, resulting in many cases from the method of acid manufacture.

Presence of impurities in the acid and solution is sufficient to cause corrosion to pass from the state of rapid corrosion with release of hydrogen to the state of low corrosion without hydrogen release. Conclusion was that laboratory tests with purified acids would be useful in the industrial application of these acids. Austenitic stainless steels can be utilized to resist corrosion by sulphuric acid, providing the acid has been adequately treated.

Boron Addition Tests—In tests on the influence of minimum additions of boron on the properties of carbon steel, it was shown that the main effects of boron are to tend toward an increase of grain size of austenite and to increase the aptitude to hardening of the metal after quenching. It was stated that this behavior is irregular and does not depend entirely upon the boron content. Carbon content ranged from 0.22 to 0.45 per cent and the boron content from 0.001 to 0.20 per cent. When a greater tendency toward hardening is observed, the physical properties of the metal are improved; it was thought that the usefulness of boron additions is limited to cases where semihard steel is to be used for making parts with thin walls which are to be hardened after quenching in water.

Rolling Flow Study—Tests were reported on various shapes ranging from 30 to 80 mm in a study of the flowing of special steel during rolling. Steel tested comprised silicon-manganese steel, cast steel with 0.9 per cent carbon, nickel-chrome steel of medium hardness, self-hardening steel and steel containing 13 per cent chromium. Each batch was tested with an ordinary carbon steel of the same size as a control. The temperatures at which the tests were made range from 800 to 1150° C.



Worried ABOUT YOUR COMPETITION?

Do your competitors produce more in less time at lower costs? Maybe they're doing it with Air Tools.

Ingersoll-Rand Air Tools will quickly and efficiently —drill—ream—tap—rivet—cut—chip—hoist—haul —grind—run nuts and drive screws. Air Tools will do all these jobs and many more in less time and at lower cost. Dependable, light, fast I-R Air Tools are the choice of realistic production men.

A manufacturer of electrical equipment installed three Air Powered Screw Drivers costing $240.00. The time saved on this application enabled him to improve his competitive situation and the tools paid for themselves in twenty-four days.

Perhaps there is an Air Tool which will do a better and quicker job for *you* in *your* plant. Ask one of our Air Power Specialists to *show you how I-R Air Tools pay for themselves nearly twice as fast under today's conditions and enable the workman to do more work with less effort.*

AIR POWER ... The Key to Lower Production Costs

Send for Form 5010A, containing over 30 pages of remarkable time and money savings made with Air Tools.

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UNIT 1520
Self-Propelled
RUBBER-TIRED
CRANE

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CAPACITY

This 50,000 pound Mobile Crane is a completely new member of the UNIT Crane and Shovel line. Designed for both "on and off" highway operation. So compact, it works efficiently even in small, cramped quarters, "in or out" of the yard.

- Rugged Construction
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- Powered by ONE Engine
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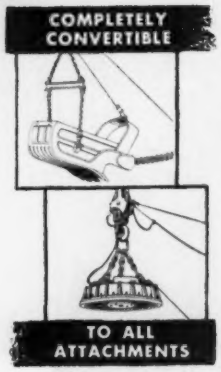
- Heavy Duty, yet operated with remarkable SPEED . . . SAFETY . . . ECONOMY!



UNIT 1520 can be equipped with retractable high A-Frame to permit capacity loads on extended boom at long radius.

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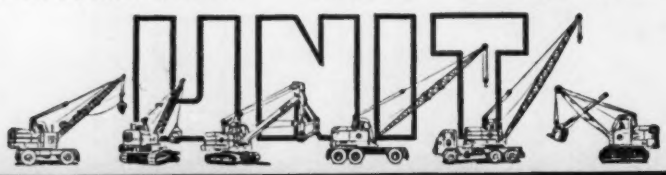

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A 5413-2/3CA

these temperatures being reached progressively. Rolling temperature and the thermic cycle of reheating seems to be more influential than quality of the steel.

Improvement of the qualities of the semifinished product is the objective of preliminary forging prior to rolling, reported at one of the sessions. It was shown that a crystalline structure is unfavorable to hot working, that there is too great a resistance to deformation during hot working and that it required too large a section for the rolling plant available. A power hammer or a press is used for the purpose. Steels which are fragile when hot are treated by the power hammer while the press is used for the more malleable steels.

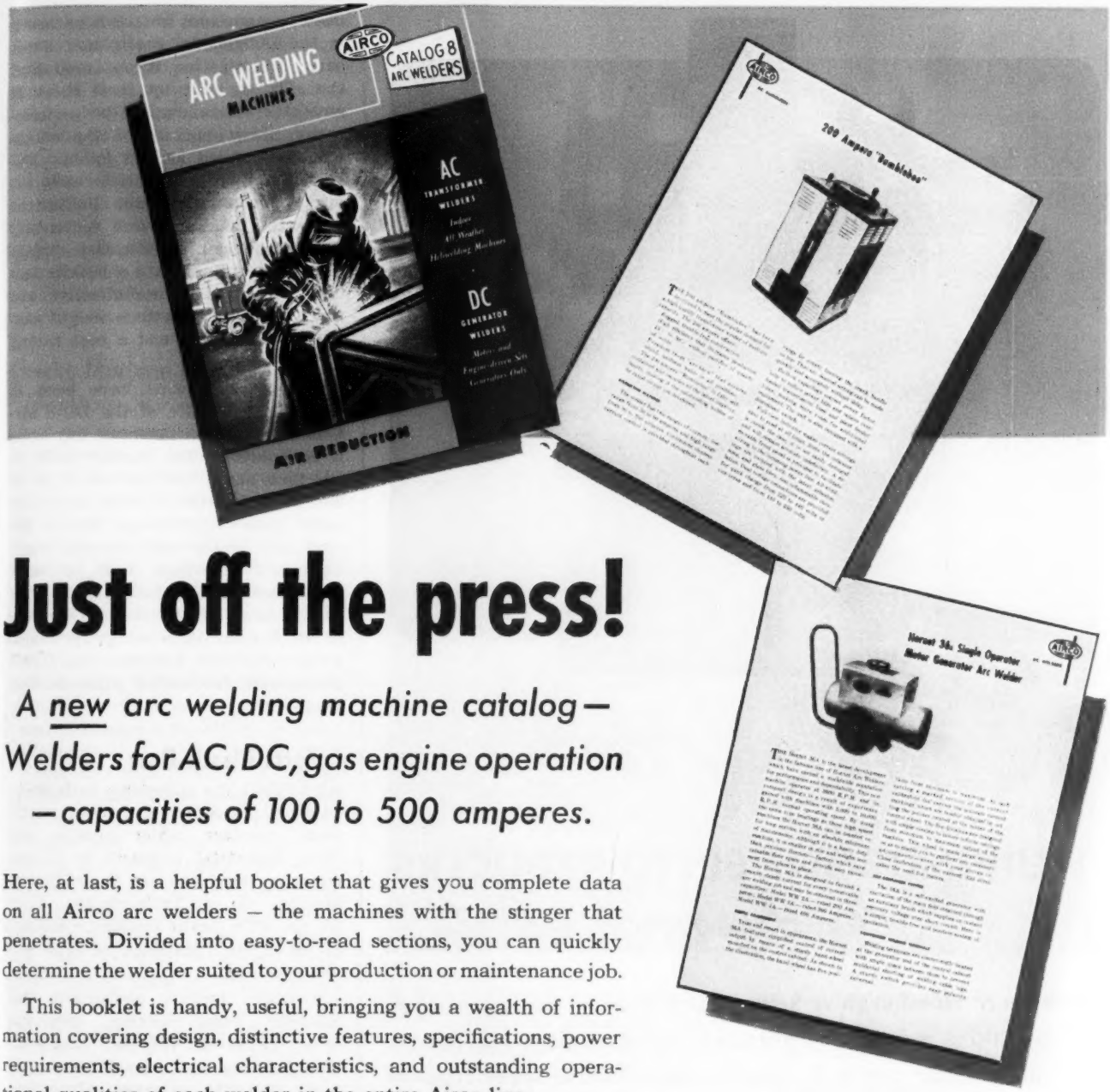
Before and After Comparison—In a comparison between the mechanical characteristics of roller products without reheating and after reheating, the results obtained show that the rolling of plates, when stopped at a temperature below the recrystallization temperature, increases the following characteristics: Elastic limit is increased up to 15.9 per cent; tensile strength is increased up to 4.6 per cent. The following characteristics showed a decrease: Elongation reduced up to 11 per cent; and resilience reduced by about 5.65 per cent.

Magnesium Alloy Improved

INCREASED toughness, relative insensitivity to notch effect and good impact toughness and fatigue strength are characteristics of an improved magnesium extrusion alloy, ZK60, containing 6 per cent zinc and 0.6 zirconium. According to Dow Chemical Co., Midland, Mich., it was discovered in experimental work that the high strength properties are due mainly to the small grain size, insured and maintained by the addition of zirconium. Other factors contributing to strength properties are extrusion conditions such as speed, temperature and reduction of cross-sectional area.

Tensile yield and compressive yield strengths of the alloy are said to be substantially the same, whereas in other wrought magnesium alloys the compressive yield is normally only 60 to 70 per cent of the tensile yield strength. While the first major uses of ZK60 were in the aircraft field, the requirements of strength, toughness, notch insensitivity and light weight are thought to be applicable in truck and trailer floor sills and parts, textile machinery and materials handling equipment.

A number of factors dictated the



Just off the press!

A new arc welding machine catalog— Welders for AC, DC, gas engine operation —capacities of 100 to 500 amperes.

Here, at last, is a helpful booklet that gives you complete data on all Airco arc welders — the machines with the stinger that penetrates. Divided into easy-to-read sections, you can quickly determine the welder suited to your production or maintenance job.

This booklet is handy, useful, bringing you a wealth of information covering design, distinctive features, specifications, power requirements, electrical characteristics, and outstanding operational qualities of each welder in the entire Airco line.

To give you some idea of the amount of material covered by this definitive booklet, here are a few of the many welders covered.

- "Bumblebee" and MCT — Transformer AC Arc Welding Machines
- "Hornet" 36A and "Wasp" — DC Arc Welding Machines
- "Yellow Jacket" Gas-Engine Driven Arc Welders
- Customer-Assembled Gas Engine Sets

See this booklet yourself . . . send for it today. Just fill in the coupon below for your free copy.

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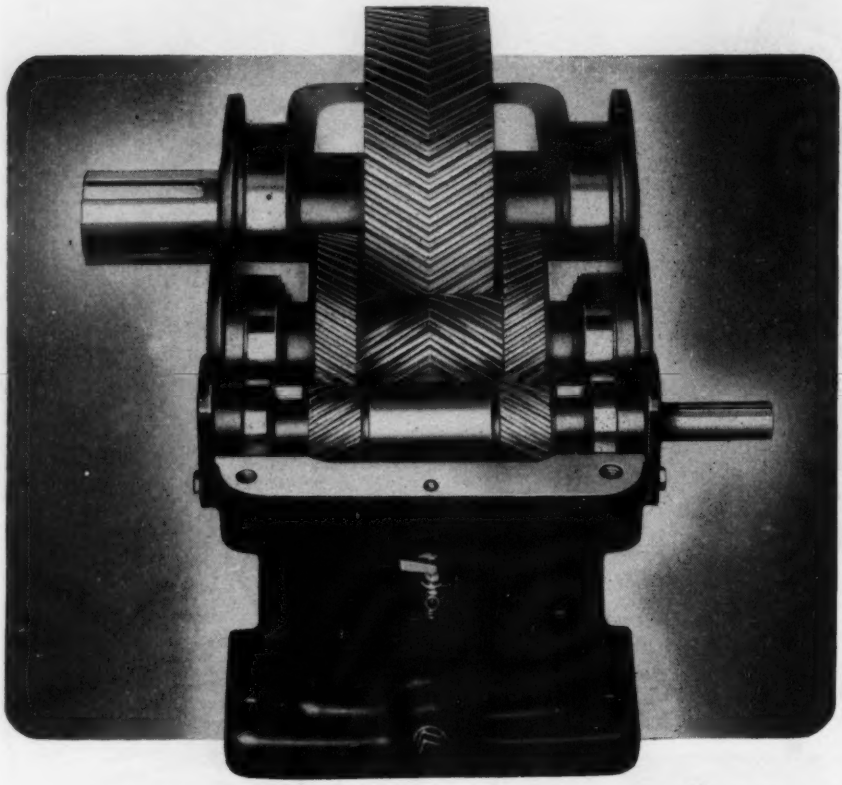

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● Every Horsburgh & Scott Speed Reducer is designed for 100% momentary overload without injury. Making this possible are such features as: Accurate Sykes type heavier, wide face gears with continuous double helical teeth, giving increased bearing surface . . . finest anti-friction bearings . . . rugged shafts and bearings . . . heavy, ribbed housings . . . close tolerances and rigid inspection. Oversize bearings provide tremendous overhung load capacity on the low-speed shaft. Even under heavy shock loads, here's quiet, smooth operation at its best.

Send note on Company Letterhead for Speed Reducer Catalog 46

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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use of magnesium for the floor beams in the Douglas DC-6 airplane. From early investigation it appeared that the sills, if built up from sheet of any other metal, would be unnecessarily heavy because of the excess material needed at the joints. Extrusions of other materials were too heavy because extrusion limitations prevented making a web sufficiently thin for structural efficiency. Magnesium extrusions with a bulkier section may pass for an effective and more rigid design with a weight saving of 5 per cent and a cost saving of 25 per cent.

These floor beams have been in service for the life of the DC-6 airplanes with no criticism of any kind, it is reported. The recently built C-124 uses about 1000 pounds of 8, 10 and 11-inch ZK60 I-beams in its design. Other applications include the spar cap in the experimental magnesium F-80 wings built by East Coast Aeronautics Inc., and the use of the alloy in the last fifteen sets of SNJ and AT-6 wings produced under military contract at Dow's magnesium fabricating plant in Bay City, Mich.

Collects Plastic Dust

ADAPTED for collecting such dusts as plastic molding compound resins, metal powders, tablet powders and other industrial products is a dust collector developed by F. J. Stokes Machine Co. of Philadelphia. It is for use with plastic molding machines of all styles, regardless of type and manufacture.

Features include continuous full capacity, easy cleaning, minimum wear, quick dust disposal, simple installation and maintenance and complete material salvage. Capacities of 90 and 150 cfm are offered.

Tools Made from Mild Steel

USE of a carbon—chromium—manganese hardening compound in powder form is enabling Wilson Carbon Co., New York, to demonstrate the making of chisels capable of chipping cold-rolled steel from ordinary mild steel. In the demonstration, mild steel in the form of concrete reinforcing rods was heated to a bright cherry red with a blow torch after having been preshaped to form a chisel. After heating, the red hot steel was stirred into a can of the powdered compound and the powder allowed to fuse on the surface. Piece was then reheated to the same temperature (about 1500°F) and quenched in cold water.

After having been case and depth

hardened by this process, the tools showed no damage to cutting edges after the chipping procedure. It is reported that the tools are found to be comparable in hardness, wear resistance and toughness to many of the high-speed tool steels. The examination of the section of the treated material is said to show the original metal to be covered by a hard, high-carbon surface layer about 1/64-inch thick, supported by a sublayer of ductile chrome-carbide, approximately 3/64-inch thick.

Checks Machine Finishes

INVOLVING the use of a special liquid casting plastic is a method for checking new or worn machine surfaces of various mechanical parts, such as gears, turbine blades, boiler tubes, journals, valve facing or seats. Developed by Marco Chemicals Inc., Sewaren, N. J., in co-operation with the Naval Boiler and Turbine Laboratory, U. S. Naval Shipyard, Philadelphia, the material is supplied in kits, each containing a pint of casting resin and the proper amount of catalyst which, when combined with the resin, will cause it to solidify in about 15 minutes.

Catalyzed plastic resin is poured against the surface to be checked and removed when hard. It provides an accurate and permanent record reflecting the surface conditions of the machined piece. For surfaces where the liquid resin would run off, cellulose tape is used to form mold walls and hold it until solidified. The green casting resin is very sensitive.

Clutch Unit Easily Attached

FOR installation between motor and driven machine is gear tooth drive clutch mechanism for starting and stopping the flow of mechanical power. A development of Edgemont Machine Co. of Dayton, O., it may be engaged and disengaged at the will of the operator. Design incorporates an extended bronze bushed sleeve, tapered on the outside diameter to fit the tapered bore of the Worthington QD sheave rims for V-belt applications.

To assemble sheave on the sleeve, it is necessary only to remove the grease fitting, place the sheave over the taper and use the sheave pull-up bolts to draw the sheave snugly into place. To demount the sheave, the same bolts are used as jack screws in the taps provided for that purpose. Made in various sizes and horsepower ratings, the complete assembly of clutch unit and sheave is supplied ready for installation on the shaft.

"WAITERS" ...cost more than "Tip-Money" in your plant!

MANUAL handling on production, assembly, or packaging lines is costly in manpower two ways—time waiting for material and time required to deliver it.

Whatever you make, package, or handle — in large or small quantities — loose or in containers — see Standard for a complete engineered gravity or power conveyor system—a portable conveyor unit — a portable, lightweight conveyor section.

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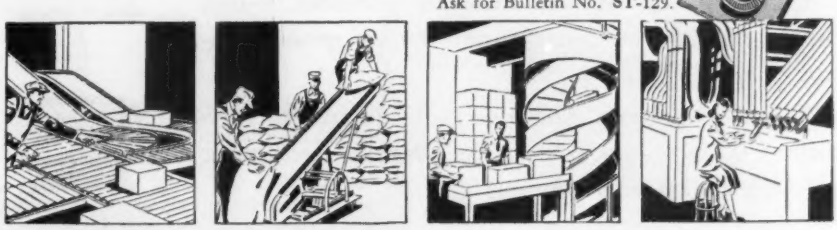

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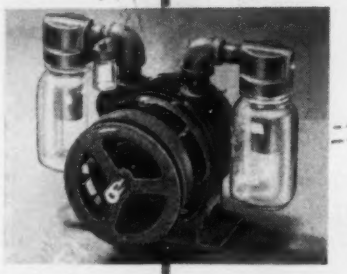
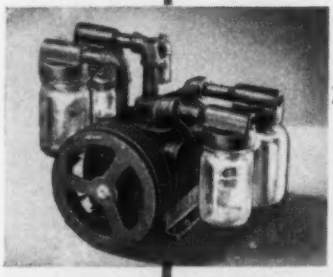
To feed materials automatically...

3 NEW GAST AIR PUMPS

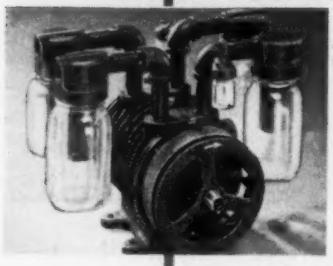


GAST ROTARY DESIGN GIVES *BOTH* VACUUM AND PRESSURE FOR FEEDING APPLICATIONS

Model 3040, new SINGLE CHAMBER PUMP—19 to 24 c.f.m. Pressure up to 10 p.s.i.—vacuum 15" and over.



Model 10 x 1040, small DUAL CHAMBER PUMP—9 c.f.m. from each chamber. Vacuum to 20", pressure to 15 p.s.i.



Model 11 x 1740, large DUAL CHAMBER PUMP—14 c.f.m. (to 10 p.s.i.) from pressure chamber; 9 c.f.m. (to 15") from vacuum chamber.

Look what these 3 new Air Pumps offer: They're designed to meet the specific needs of automatic feeding operations . . . handling paper, cardboard, thin metal, acetate, etc. They give *both* strong "blow" for separating—and large capacity low vacuum for "pick-up" of sheet materials.

With all the inherent advantages of Gast Rotary Design, they run quietly, producing large volume per horsepower at comparatively low speeds. They're trim in appearance and unusually compact. V-belt drives simplify installation and make speed control easy.

If you're building machines that can be fed with suction fingers—you'll want full details. Remember —"Air may be *your* Answer!"

WRITE FOR DETAILS ON 3 NEW AIR PUMPS—ALSO "APPLICATION IDEAS" BOOK

GAST ROTARY

AIR MOTORS - COMPRESSORS - VACUUM PUMPS

(TO ONE H.P.) (TO 30 LBS.) (TO 28 INCHES)

GAST MANUFACTURING CORP., 133 Hinkley St., Benton Harbor, Mich.

Behind the Scenes

(*Concluded from Page 4*)

pick up a couple of flappers? Could they neck? Hot diggety!"

"You used to be quite a cake eater, George," I said. "Do you still do the Blackbottom?"

"I put on too much weight," said George. "This food nowadays seems to be more fattening."

"I know," I said. "You mentioned that just a minute ago."

"Did I?" said George.

"How about another Martini?" I said. "Have you noticed the Martinis aren't as strong as they used to be?"

"Yeah," said George, "You said that twice before."

"Oh," I said—

I got to thinking about poor old George while I was shaving this morning. I stopped and looked at my own reflection in the mirror—they don't seem to be the same make of mirrors any more.

As they say in some of the magazines these days, you may now resume your reading back up front again. See you on page 4 again next week.

Shrdlu

List Copper Shot Advantages

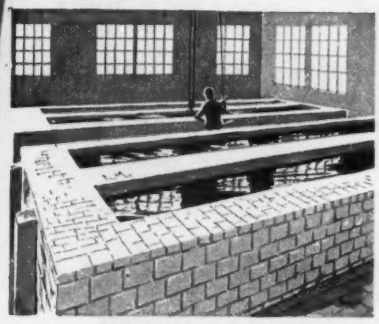
FINISHES of natural color, no imbedding of hard abrasive in soft metal parts, no subsequent rusting or staining, and increased life of wearable parts of the blast cleaning machine are advantages of copper shot explained in bulletin No. 69, available from American Wheelabrator & Equipment Corp., Mishawaka, Ind. Entitled "Copper Shot for Blast Cleaning and Finishing Non-Ferrous Metal Parts," the bulletin enumerates performance results, shows advantages in appearance, cost, etc.

Solder Has High Strength

POSSESSING high strength and a low melting point, a new hard solder type alloy is available for joining aluminum to steel, bronze and copper as well as aluminum. Developed by Eutectic Welding Alloys Corp., New York, it may be used for sealing cracks, spot welds and general soldering of aluminum and is useful where as white a solder as possible is desired.

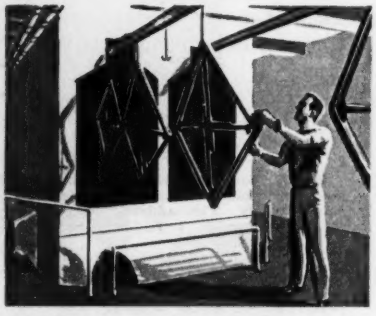
Availability is in 1/16, 3/32 and ⅛-inch coil form. Designated as Eutecrod 192, it is said to give a high strength bond between aluminum and ferrous and nonferrous metals. Bonding temperature is 650 to 700° F, with a tensile strength of 11,000 psi.

which job can you do better with Oakite metal-cleaners?

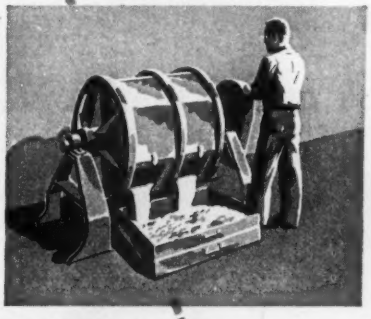


PICKLING? Oakite Pickle Controls minimize attack on steel; don't retard action on scale, rust. Prevent waste of acid after scale or rust dissolves. They inhibit hot sulphuric-acid and hydrochloric-acid pickling baths.

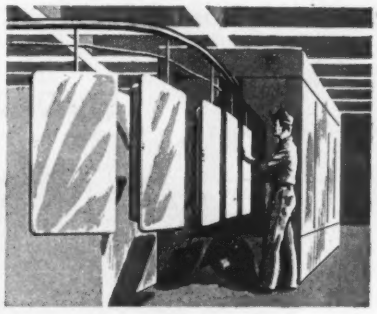
ELECTROCLEANING? Oakite Composition No. 90 removes oils, smuts, films that interfere with good electrocleaning on steel. Has high conductivity, good wetting action. Bubbles keep alkaline spray from being nuisance, yet prevent explosive foam.



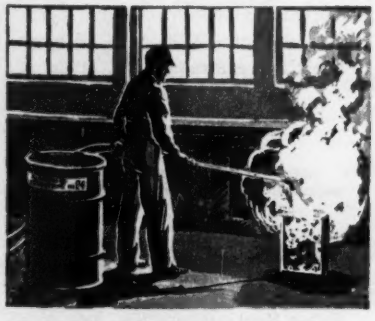
PRECLEANING? In spray-washing machines, Oakite Composition No. 97, emulsifiable solvent cleaner with water, removes buffing and other compounds from steel, cast iron, brass, aluminum, zinc. Gives temporary rust prevention. Use before electrocleaning, plating.



BALL BURNISHING? Oakite Composition No. 3 lubricates, "suds up" even in hard water. Free of metal-harming ingredients. Suspends dirt, keeps it from smudging work. Brings out brilliant luster on metal. Also good to clean shots, shapes.



PRE-PAINT TREATMENT? Oakite CrysCoat Process conditions iron, steel, zinc, copper alloys 3 ways: removes light oils, spinning compounds; develops phosphate film that *holds* finishes; inhibits rust before and after finish. Low cost per sq. ft.



STEAM CLEANING? Oakite Composition No. 92 removes grease and dirts quickly. No toxic vapors. Detergency combines with steam pressure to clean fast. Good on big parts. All you need is hose, gun, solution container, 40 lbs. steam pressure.

PRECLEANING IN TANK? Oakite Compound No. 36, acidic cleaner conditions aluminum for paint. Makes surfaces inert as possible. Provides microscopic phosphate film ideal for tenacious finish adhesion. Guards against scratched-finish corrosion.

. . . every job and at lower per-unit cost. For free proof, check here:

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☐ ball burnishing ☐ steam cleaning
☐ precleaning in tanks ☐ prepaint treatment
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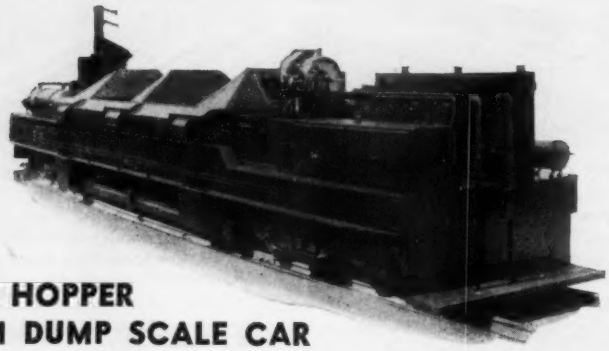
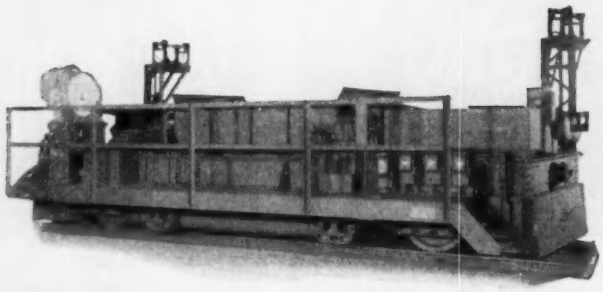
TO MEET SPECIFIC—INDIVIDUAL TRANSFER PROBLEMS



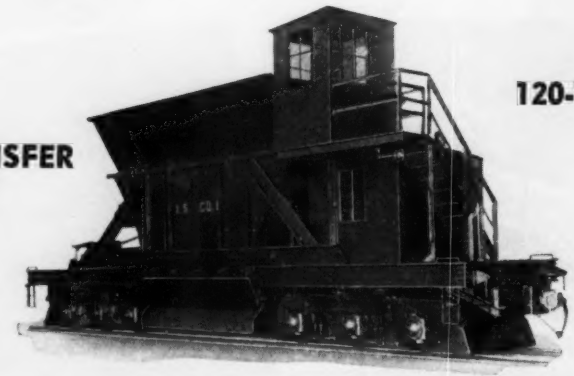
20-TON
DOUBLE HOPPER
BOTTOM DUMP SCALE CAR



10-TON
DOUBLE HOPPER
BOTTOM DUMP SCALE CAR

120-TON
ORE TRANSFER
CAR

SIDE
DUMP



ATLAS BUILDS:—Scale Charging Cars and Ore Transfers; Indicating and Recording Dials for weighing scales; Electric and Storage Battery Locomotives; Coal Charging Cars; Door Extractors; Coke Quenching Cars; Turntables.

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IS ALWAYS AT YOUR SERVICE

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

LETTERS
to the Editors

Cost Cutting

One of our clients is interested in the survey mentioned on page 63 in the Nov. 14 issue of STEEL, by Walter Mitchell Jr., research director, Controllership Foundation, research arm of Controllers Institute of America. We would like very much to obtain a copy of this survey and are writing to you for information on how to obtain one.

D. F. Harbridge Jr.
Little & Co.
Los Angeles, Calif.

We would appreciate receiving a few copies of "33 Ways To Cut Costs". You suggest this as a good check list for management in your views of news column in the Nov. 14 issue.

C. J. Koepke
Controller
Triplex Screw Co.
Cleveland, O.

We do not have copies of the survey, but you may obtain them by writing to the institute directly. The address: Controllers Institute of America, 1 E. 42nd St., New York, N. Y.—The Editors

Melts Ice and Snow

In the Nov. 7 issue of STEEL Magazine the writer noticed an announcement regarding a chemical which is intended for use in melting snow and ice. It further stated that this was available from Chem Industrial Co., Cleveland, which we have been unable to contact. Will you please advise their full address?

Foster C. Koehn
Plant Engineer
Falk Corp.
Milwaukee, Wis.

Address of Chem Industrial Co. is 1114 Hippodrome Bldg., Cleveland 14, O.—The Editors

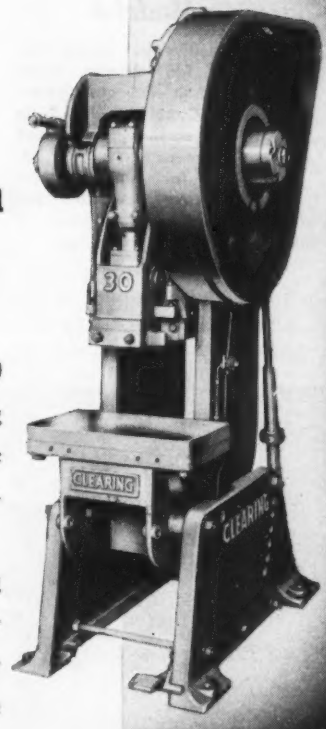
Cheers on Price Section

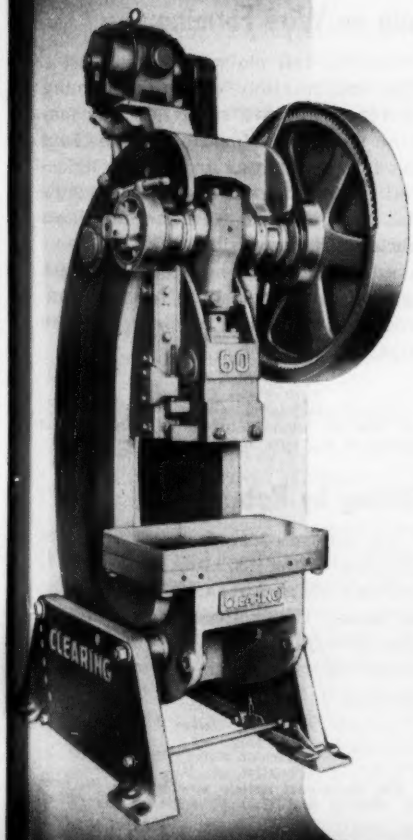
I have reviewed your new Steel Price Section in STEEL beginning with the issue dated Sept. 19, 1949. I think it is one of the best things you could do. It will be very helpful and I compliment you on this move.

H. L. Erlicher
Vice President
General Electric Co.
Schenectady, N. Y.

Investment Casting

If at all possible, we would like to have six additional copies of the Nov. 7, 1949 STEEL magazine. We like, very much, the article, "Centrifugal and Vacuum Investment Casting . . .", on pages 116 and 117 and we would like





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Now you can get, in open back inclinable presses of 30 tons capacity and larger, the same advanced engineering and modern construction principles which have made large Clearing presses the overwhelming choice of cost-wise production men.

Frames are steel weldments—pioneered by Clearing in the press field—to give these OBI presses greater rigidity, which means more precise operation and longer life for your dies. The swing key positive clutch or the packingless pneumatic clutch, optional on most models, mean quick, trouble-free action.

Send for your free copy of Bulletin 211 for details about this new line of presses.

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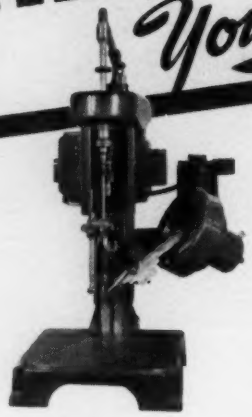

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DETROIT POWER SCREWDRIVER

to Fit Your Needs

Discard the out-of-date, slow hand method of driving screws. . .Do it this speedy, time and labor saving way that will boost your production and bring costs down.

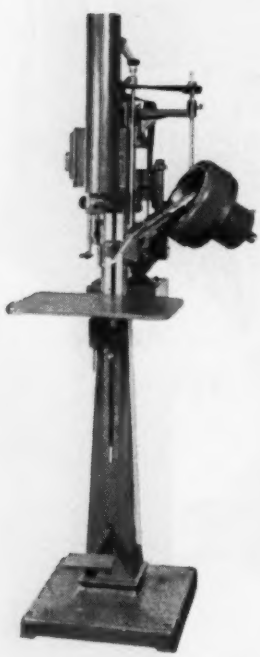
Cash in on its advantages like thousands of other manufacturers are doing . . .Start with the new year. We can make

IMMEDIATE SHIPMENT

on certain models. Detroit Power Screwdrivers are hopper-fed and furnished in three models. . .Will drive all types of screws, as fast as one a second. . . All driven to uniform tension. . .Will not strip threads or mar heads.

Model A

A sensitive but sturdy machine for driving small screws in delicate assemblies. Capacity, No. 2 to No. 6 screws. Both bench and pedestal types. Designed for maximum service, easy operation and speed.

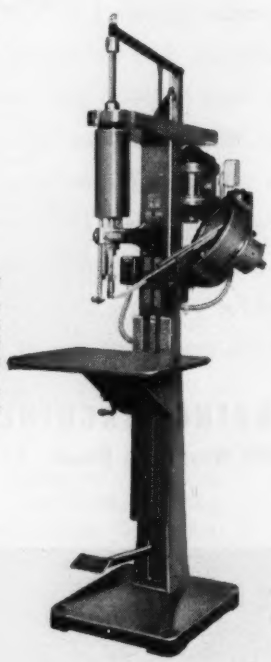


Model B

A real production machine designed for constant service. It drives a range of screws of all types from No. 6 to 1/4" diameter, up to 2" length. Both bench pedestal types.

Model C

A powerful machine for heavy-duty assembly work. Every part husky enough to stand driving hardened cap screws to a tension of 50 foot pounds. Capacity, 1/4" to 5/8" diameter screws.



Write for Catalog

SEND SAMPLE ASSEMBLIES FOR ESTIMATE

DETROIT POWER SCREWDRIVER CO. **2811 W. FORT ST. DETROIT 16, MICH.**

to have our representatives carry this magazine with them for the next few months, as it gives a complete story of the investment casting procedure. We think you did a very good job on this and Mr. E. F. Ross, your Chicago Engineering Editor is to be highly complimented.

Mel F. Burr
President
Electronicast Inc.
Chicago, Ill.

Steep Rock in Sweden

A few weeks ago our local papers referred to an article in your publication dealing with recent tests of Steep Rock ore in Swedish laboratories. I have made every effort to find a copy of STEEL in Toronto, but without success. I am wondering if you would be kind enough to send me a copy of the issue in which the article appeared.

A. A. MacLeod, M.P.P.
Ontario Legislative Assembly
Toronto, Canada

A copy of the article, "Wiberg-Soderfors Method for the Manufacture of Sponge Iron," is being sent. It appeared on page 72 of the Sept. 19, 1949 issue.—The Editors

Help on Wire Forming

Can you tell me where I can get a little information on wire forming machines. I have reference to a machine which will form or weave chain link fabrics such as are used in industrial or lawn fences, also a machine that will weave ornamental lawn fabrics. It is possible that the same manufacturer will be able to furnish us with a wire machine for the manufacture of snow fencing on corn cribs.

L. Roy Ford Sr.
Ford Fence Co. Inc.
Indianapolis, Ind.

A list of manufacturers of this type of equipment is being forwarded.—The Editors

Slitting by Rotary Gang

We are interested in your article, "Rotary Gang Slitting," by E. L. Mackay which appeared in your Sept. 25 issue. We noticed that this article is continued and would like to know in what issue it will appear again.

A. G. Ringlen
Chief Engineer
American Safety Razor Corp.
Brooklyn, N. Y.

The three-part article appeared in the Sept. 26, Oct. 3 and Oct. 17 issues.—The Editors

Change Means Progress

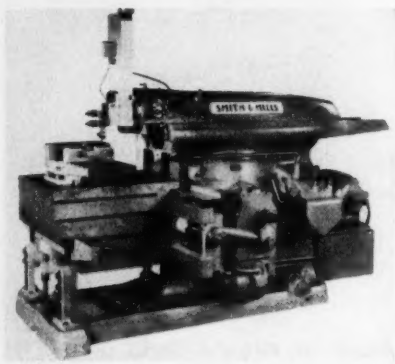
May I congratulate you on STEEL's new Market Section. It is a big step forward and performs a real service to interested readers. STEEL apparently favors change when change means progress.

William F. Horsch
Western Manager of Sales
Pittsburgh Metallurgical Co. Inc.
Detroit, Mich.

New Products and Equipment

Shaper for Large Castings

Time saving features incorporated in 32 and 36-inch shapers designed by Smith & Mills Shapers Inc., Division of Hamilton-Thomas Corp., Hamilton, O., include horizontal and vertical power rapid traverse to the table, automatic tool lifter and automatic vertical feed to the tool. Greater capacity for shaping large castings under the ram is obtained by means of a drop table; to increase cross table travel, the table itself has been widened.



For standard work, the table filler block is provided to be mounted on the drop table. The 32-inch shaper shown offers a maximum clearance under the ram of 26½ inches, maximum table travel of 40 inches and a table width of 30 inches.

Check No. 1 on Reply Card for more Details

Welding Control Is Electronic

No moving parts in power and control circuits except initiation and solenoid relays feature two all-electronic, high-speed resistance welding control units, offered by Westinghouse Electric Corp., Pittsburgh 30, Pa. For synchronous or nonsynchronous operation, they have basic control panels consisting of the plug-in Rectox rectifier tube firing panel for nonsynchronous units or a heat-control firing panel for synchronous units. Basic controls also include the 3-B sequence weld timer which controls squeeze time, weld time, hold time and off time for a single impulse spot welding.

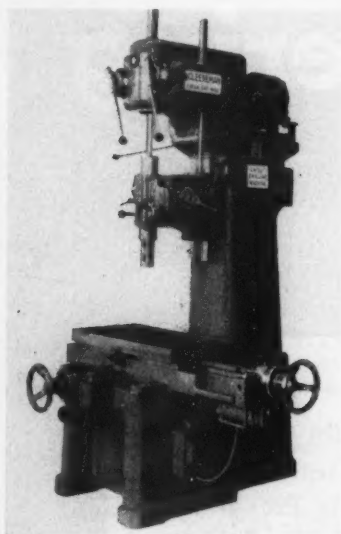
Substitution of a precision weld-time panel for a 3-B or 5-B sequence weld timer provides synchronous precision control when the heat control panel is used. Space is provided for addition of auxiliary control panels to meet specific requirements, these including an alternating current forge timer, direct current precision-type forge timer, wave-shape control, voltage compensator, etc.

Check No. 2 on Reply Card for more Details

Layout Drilling Machine

Convenience in drilling, boring, tapping, reaming, milling and similar operations, is provided by the layout drilling machine introduced by Cleereman Machine Tool Co., Green Bay, Wis. Applicable to tool work, die casting molds and to blanking, punching, forming and drawing dies within its designated limits, the machine has a combination boring and drilling spindle with a No. 4 Morse taper.

Sliding head has a friction type clutch with automatic adjustable depth kickout. Movement of saddle and table are controlled by lead screws accurate to 0.0001-inch with a cumulative error not to exceed 0.001-inch in 24 inches. Power rapid traverse to table movements is an optional feature. Automatic safety stops are provided at the extremes of travel and power rapid traverse gives greater speed in setting up work, positioning for locations, and checking out jobs.



Check No. 3 on Reply Card for more Details

Wide Range Muffle Furnaces

Thirty-six steps of heat control through a transformer are provided in the multiple unit muffle furnace manufactured by Hevi Duty Electric Co., Milwaukee 1, Wis. Units may be used for the drying of precipitates, ash determinations, heating metals and alloys, enameling, etc.

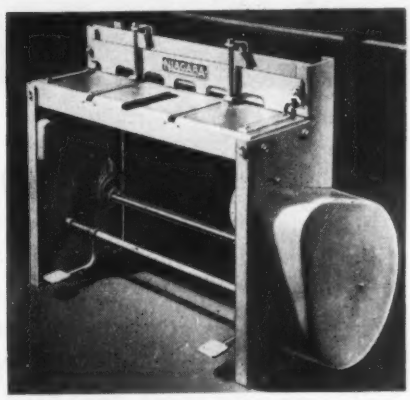
There are four individual heating units in the furnace, each one easily replaceable and reversible. Controls are mounted on a sloping, recessed panel at the front of the pyramidal type base. Maximum heat of 1850° F is reached in 65 to 85 minutes, depending upon the size of the furnace. The furnace door, hinged at the bottom, serves as a working shelf.

Check No. 4 on Reply Card for more Details

High Speed Power Shears

Straight and clean cuts may be produced continuously at 125 strokes per minute on mild steel up to 20 gage in thickness with the line of high speed power shears for light gage sheet metal introduced by Niagara Machine & Tool Works, 637 Northland Ave., Buffalo 11, N. Y. Full visibility of the cutting edge through the arched openings and over the top of the holddown bar facilitates shearing to accurate layout lines. Housings, bed, holddown and crosshead are fabricated from electrically welded steel plates.

An axial air gap or "pancake" type motor is almost entirely concealed in the right hand upright. A rugged steel clutch with positive mechanical engagement is designed for high and continuous speed. Nominal cutting lengths on the three models available are 30, 36 and 42 inches.



Check No. 5 on Reply Card for more Details

Laps Gears Diagonally

Used in the manufacture of gears, especially as a salvaging operation, is diagonal gear lapping which is performed on the Red Ring diagonal lapping machine announced by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. This operation usually requires only two passes of the work through the lap, one forward and one back. It will correct most of the eccentricity error and oversize gears can be brought to

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Edgar E. BROSIUS Company, Inc.

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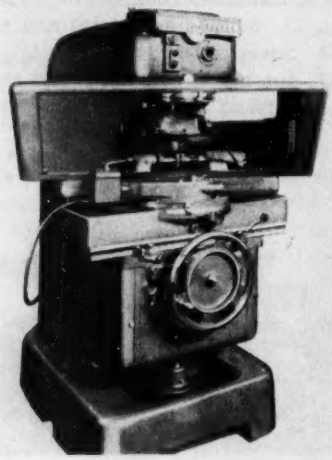
size without depending upon the machine operator for size infeed control.

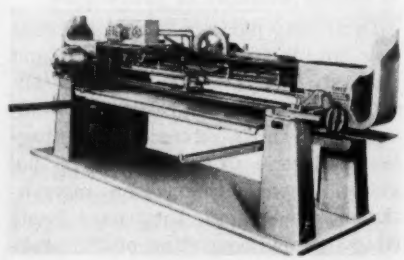
Principle of crossed axes lapping is retained in the design of the machine. Lap head setting can be precisely positioned for any selected angle between work gear and lap axes. The method permits a crown to be produced on straight teeth during the lapping operation. Subwork table is hinged to compensate for nonuniformity in gear size, to facilitate loading and reduce operator fatigue and to maintain any predetermined pressure between lap and work.



Check No. 6 on Reply Card for more Details

Variable Stroke Speed Sander

A nonstop stroke adjustment feature permits automatic adjustment of stroke lengths from 16 inches to 8 feet without stopping the 43R1-DB double reversible belt hydraulic stroke sander, offered by Curtis Machine Division, Lincoln Park Industries Inc., Jamestown, N. Y. Speed of the double hydraulic-driven head is infinitely variable up to 250 strokes per minute.



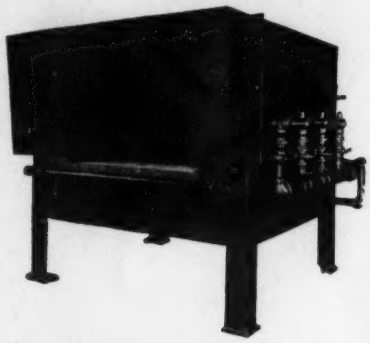
Two belts, each driven by its own motor, are independently reversible and may be used interchangeably without stopping the machine or removing the work from the table. Rough and finishing operations thus are permitted in one setup. Operational controls are grouped on a compact panel within operator's reach.

Weight of unit is evenly distributed over the four pedestal base.

Check No. 7 on Reply Card for more Details

Heavy Duty Forge Furnaces

Heat loss through the wall is reduced to a minimum by insulating firebrick in the improved line of gas-fired forge furnaces announced by Eclipse Fuel Engineering Co., Rockford, Ill. Designed for heavy duty and continuous operation at the usual forging temperatures of



2200° F, the furnace shell is constructed of heavy angle framework with sides and back of steel plate. To increase the safety and comfort factor, the operator is protected by a curtain of air which carries heat away from him and behind a refractory-lined heat shield.

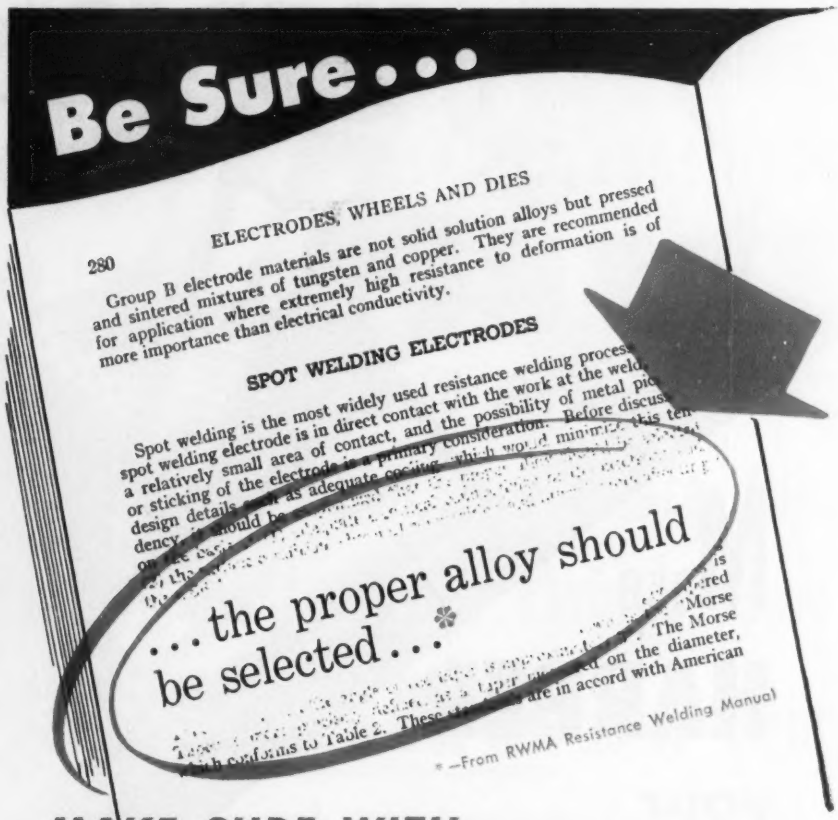
Burners used are of the seminozzle mixing McKee entrainment type and are located so as to prevent flame impingement on the pieces being heated and to give uniform heat distribution. The McKee zero governor gives automatic control of the gas-air ratio throughout the entire burner range. Sillimanite tuyere burners are used to insure long block life and a minimum of slag.

Check No. 8 on Reply Card for more Details

Drills Precision Holes

Operating without vibration at a speed of 50,000 rpm on a line pressure of 100 psi is the model D1-S precision hole grinder offered by Onsrud Machine Works Inc., 3942 Palmer St., Chicago 47, Ill. Consisting of a high speed air turbine motor mounted on a Chandler boring and facing head, the unit is for use on jig borers, vertical and horizontal milling machines, boring mills, lathes, surface and internal grinders and drill presses. Vernier calibration permits reading of off-center head adjustment to 0.0001-inch.

Grinder is designed for use with wheels from ⅛ to ¾-inch in diameter. Head adjustment permits grinding holes up to 2¾ inches in


Be Sure . . .
ELECTRODES, WHEELS AND DIES
280
Group B electrode materials are not solid solution alloys but pressed and sintered mixtures of tungsten and copper. They are recommended for application where extremely high resistance to deformation is of more importance than electrical conductivity.
SPOT WELDING ELECTRODES
. . . the proper alloy should be selected . . .
*—From RWMA Resistance Welding Manual

MAKE SURE WITH

WEIGER-WEED

SPOT WELDING TIPS

For top production speed, with fewer dressings be sure you choose the proper alloy for every spot welding job. When properly applied Weiger-Weed Tips assure longer life, sounder, cleaner welds—at lower cost! Standard Weiger-Weed tips, pointed, dome, flat, offset are available from stock—also many irregulars. Specials are promptly produced from specifications. Weiger-Weed supplies electrodes in 13 alloys of proven correct properties for each and every requirement of spot, seam, flash, butt, and projection welding. WW-1 Metal, for example, is best for welding scaly metals, galvanized iron, terne plate, tin plate and other coated metals, aluminum and its alloys. WW-2 Metal gives better performance on cold rolled steel, pickled hot rolled steel, nickel, cupro nickel, nickel silver, chrome plate, phosphor bronze, silicon bronze alloys, stainless steel, etc.

You'll also be interested in the line of Weiger-Weed Water-Cooled Holders—today's outstanding leakless holders—always trouble free. Weiger-Weed & Company, Division of Fansteel Metallurgical Corporation, 11644 Cloverdale Ave., Detroit 4, Michigan.

11506-B

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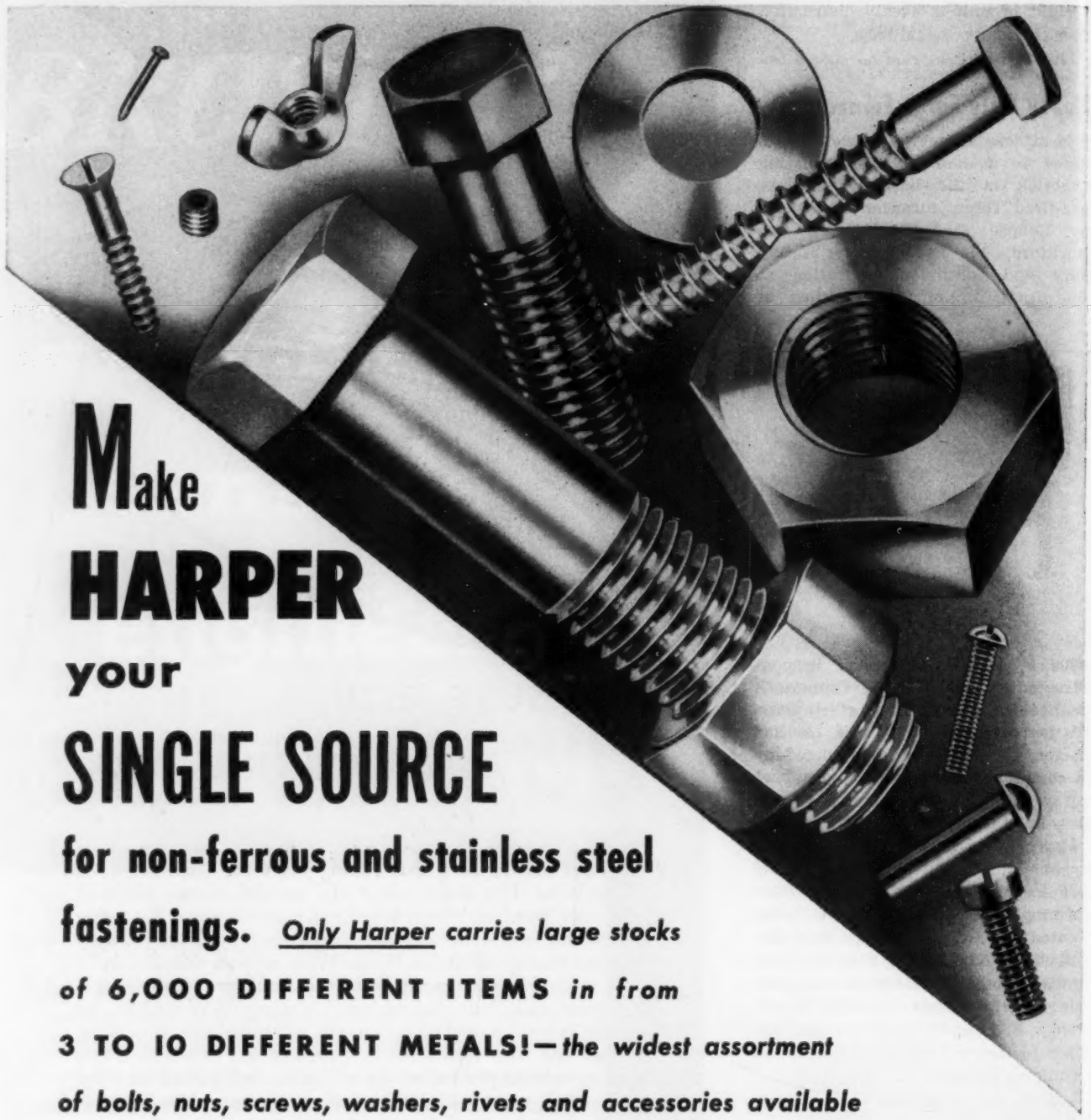

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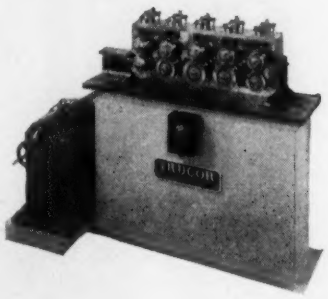
EVERLASTING FASTENINGS

diameter and an adaptor plate accessory permits additional adjustment for holes up to 4 inches in diameter. Head slide may be adjusted for off-center position from 0 to 1 inch in steps of 0.0001-inch.

Check No. 9 on Reply Card for more Details

Machine Forms, Curves, Embosses

Forming, curving, embossing and cutting operations are performed in one continuous operation on roll forming machines built by American Roller Die Corp., 20513 St. Clair Ave., Cleveland 17, O. Standard size machines take material up to 5 inches wide and 20 gage thickness. Larger



sizes for material up to 50 inches wide and ⅜-inch thick are available.

Type H machine illustrated is an outboard or overhung machine of all steel construction which may have any number of spindles and which will handle material of any desired width. Speed in feet per minute varies from 50 to 300. Two adjusting screws for each of the top spindles are connected in such a manner that by turning either one, the top spindle is raised or lowered, maintaining a parallel relationship with the bottom spindle.

Check No. 10 on Reply Card for more Details

Plots Variable Relationship

Relationship between two variables, showing one as a function of the other, is automatically plotted by the Speedomax recorder, developed by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. Variables to be plotted are converted direct current signals and connected to the instrument, one to the horizontal axis and the other to the vertical axis. Recorder has two measuring circuits which present a permanent record.

It is possible automatically to draw curves such as a hysteresis loop, temperature vs temperature differences, stress vs strain or other two variable curves. Response of the instrument is amply fast, the pen

*CLARK materials-handling methods and machines constitute a team that CURBS wastes common to most handling operations. When and where this team goes to work, savings start CLIMBING as of "right now," and break-even points fall quickly to "breathe-easy" points. You can't beat this team, but you can join it to bring down production COSTS to a comfortable level.

How several blue-chip industries are curbing costs to the benefit of their profits is told and illustrated in "Material Handling News," the interesting "tell how" magazine and in Clark's "show how" motion pictures. You can use both to advantage simply by requesting them on your business letterhead.

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REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

taking only 3 seconds for full scale travel of 9⅞ inches.

Check No. 11 on Reply Card for more Details

Hydraulic Control Drill Unit

Completely automatic and supplied with remote electrical controls is the model "KH" automatic drilling unit with full hydraulic control, offered by Govro-Nelson Co., 1933 Antoinette St., Detroit 8, Mich. Feeding pressure of the unit is derived from centrifugal force and is accurately controlled by hydraulic means.

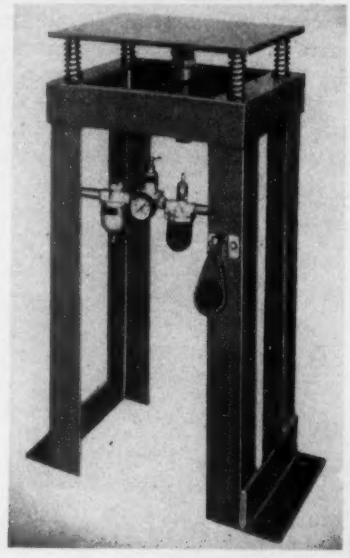
Amount of rapid approach, rate of feed and overall length of stroke may be changed as desired by external adjustment. This means of adjustment permits use of the unit on a full range of drill sizes with minimum setup time. Unit handles 1/32 to 1/4-inch tools with standard collet chuck.

Check No. 12 on Reply Card for more Details

Vibrating Table Is Pneumatic

A maximum speed of 1950 vibrations per minute is provided by vibrating tables using pneumatic power, offered by Cleveland Vibrator Co., 2780 Clinton Ave., Cleveland 13, Ohio. Unit has a solid 12 x 18 x ½-inch sheet steel platform and table is controlled by a knee valve which actuates the vibrating mechanism. Steel platform can be replaced with a wood platform or various types of screens to handle a wide range of applications.

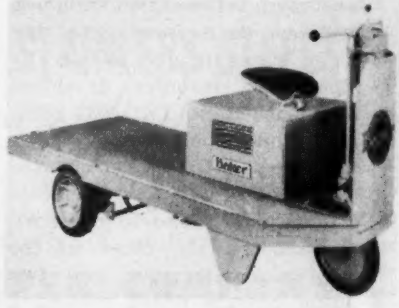
Vibration intensity can be varied by the operator by means of a pressure control regulator. Steel springs "float" the all-steel platform to prevent transmission of vibration to the floor. Steel pins limit lateral platform movement. Standard equipment for the model CVT-10 table includes an air line filter, air line lubricator, pressure control regulator.



Check No. 13 on Reply Card for more Details

Lightweight Platform Truck

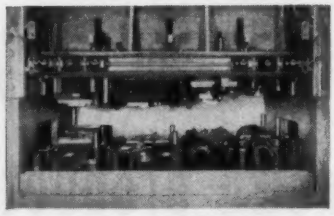
Versatility of the Baker Hustler, type PB 2000 pound platform truck, built by Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O., is shown in its use as welding wagon, plant maintenance truck, personnel car, millwright utility truck, pipefitter's bench, etc. Adapted to the special applications and to less-than-carload freight handling, the truck has an overall length of 104¾ inches. The battery box is located to one side



DE-STA-CO *Versatility* WORKS FOR YOU!

Automatic Transmission Oil Pan. Formerly tied up two presses; now confined in one press with two dies, cutoff and draw and redraw. Result . . . saving on press labor, saving on handling.

The three parts illustrated are typical of the versatile performance we get from just *one* of our presses. By taking every advantage of modern, high-production equipment, large bed area, progressive tooling and every mechanical aid, we save for you—our customer. That's why buyers across the nation say: "For medium-large jobs and smaller, Detroit Stamping's our Number One source."



Washing Machine Water Intake Manifold. Originally used four presses. By use of four individual dies in one large press, savings of 25% on press labor, 30% on handling were obtained.

Analyze *your* component stampings. Probably there are several that could be handled better the De-Sta-Co way. You'll find it profitable and pleasant to join our distinguished clientele, customers who have helped us build a reputation for

- Reliability, resulting from 35 years of well-kept promises
- Helpful experience and tool-engineering "know-how"
- Broad production scope from first-class equipment
- Devotion to service and quality

Roof Rail for Semi-Trailer. Stock sheared to 56" length beforehand. Blank is formed and bent in one stroke. This operation utilizes the large bed area (48" x 72") and long stroke (10").

Our new booklet, "Stampings", describes our plant, over 75 presses—also other equipment, and the range of our production. Please write for your copy and the name of our Stampings Sales Representative in your area.

DETROIT STAMPING COMPANY
359 Midland Avenue Detroit 3, Michigan

Manufacturers of famous De-Sta-Co Toggle Clamps, Arbor Spacers, Shims, Shim Stock, Blower Housings, Refrigerator Compressor Valves.

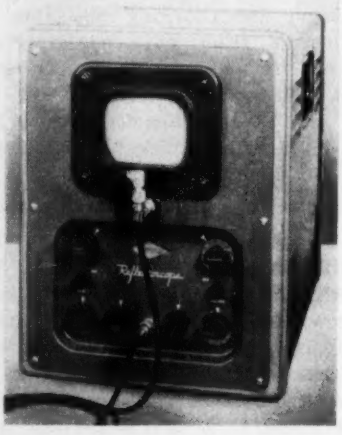
of the platform to permit carrying of long loads on the opposite side.

A load area of 20 sq ft is obtained with the truck's 56-inch long platform. Platform is 18¼ inches above ground level. The reversing controller, interlocked with line contactor, affords three speeds forward and reverse. Dead-man control and safety interlock is obtained through a foot switch.

Check No. 14 on Reply Card for more Details

Portable Ultrasonic Presser

Modifications which facilitate interpretation of test results are incorporated in the portable model of Reflectoscope ultrasonic instrument for testing materials, announced by Sperry Products Inc., Danbury, Conn. A reject control on the type UR, style 50E351 instrument gives the operator additional control of sensitivity by rejecting indications of small defects which do not affect the performance of the part or material under test.



Instrument consists of a pulse-generator for generation of short pulses of electrical energy at various frequencies, a searching unit for converting the electrical energy into ultrasonic energy, an amplifier for increasing pulse amplitude sufficiently to cause an indication on a cathode-ray tube, a sweep generator to provide a time base for the cathode-ray tube and a marker generator which produces a square-wave trace to furnish a measurement of distance.

Check No. 15 on Reply Card for more Details

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BURNS COMBUSTIBLE MIXTURE OF GAS: Pyronic tunnel burners, developed by Bryant Industrial Division, Cleveland 10, O., burn any combustible mixture of gas over a wide range of mixture pressures. Available in capacities from 6000 to 1,660,-

Murphy Paint Co., Ltd., subsidiary of Pittsburgh Plate Glass Co.

You can total profits NOW with INVESTMENT PROTECTION!

Here's another case history on the advantages of "Automatic" Sprinklers . . . further proof that profits can be totaled NOW with INVESTMENT PROTECTION. Representing a property valuation of over $1,500,000, the Toronto plant of Murphy Paint Company, Ltd., is a perfect example of modern thinking from a construction point of view. That same thinking held sway when it came to the selection of fire protective equipment for the safety of lives and the preservation of property. "Automatic" Sprinklers, on their record of performance, were the management's choice.

But savings are also of important concern to Murphy Paint and they report, that in their case, "Automatic" Sprinklers will pay for themselves through reduced insurance rates in about five years. That's INVESTMENT PROTECTION, considerably less costly than would be fire destruction. It's substantial reason why executives in all types of business are specifying "Automatic" Sprinklers for both old and new construction. They've made them their first line of fire defense and, ***you should too.*** *They're an important investment today . . . perhaps welcomed protection tomorrow.*

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

Typical "Automatic" Sprinkler protected properties include: Industrial Plants, Storage-Warehousing, Mercantiles, Piers-Wharves, Aviation Properties, Hospitals-Institutions, Hotels, Schools-Colleges, Offices, Public Buildings and many other types of occupancies.

IN CANADA
"AUTOMATIC" SPRINKLER COMPANY OF CANADA, LTD.

"Automatic" Sprinkler
FOR INVESTMENT PROTECTION
DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

000 Btu per hour, units are designed to operate efficiently without special adjustment anywhere in the 450-3100 Btu gas range.

Check No. 16 on Reply Card for more Details

LIFTS HEAVY DRUMS: Towmotor Corp., Cleveland, O., announces a fork lift truck attachment, the hydraulically controlled revolving barrel grab. Designed to lift and transport open-end drums and to discharge their heavy contents, device is easily attached to lifting carriage of the truck. Lifting capacity is 2100 pounds.

Check No. 17 on Reply Card for more Details

LIGHT-DUTY FLEXIBLE SHAFT COUPLINGS: A new series of light-duty flexible shaft couplings is announced by Elliott Mfg. Co., Binghamton, N. Y. They can be used for knob controls of small valves, gears and pulleys and as a driving medium for light transmission systems when connected shafts are misaligned.

Check No. 18 on Reply Card for more Details

COATING FOR CONCRETE AND METAL: Designated as Chlo-Dur, a new series of Tuf-On coatings formulated for use on concrete and metal is announced by Brooklyn Varnish Mfg. Co. Inc., Brooklyn 1, N. Y. Based on chlorinated rubber, finishes have chemical inertness of the base material. It is available in colors.

Check No. 19 on Reply Card for more Details

FOR MAKING STRONGER JOINTS: A new Rol-Air flaring tool, which both flares and burnishes copper, brass and aluminum tubing for making tighter and stronger SAE flared tube joints is introduced by Imperial Brass Mfg. Co., Chicago 7, Ill. It is known as No. 355-F and flares ¼, 5/16, ⅜, ½ and ⅝-inch OD tubing.

Check No. 20 on Reply Card for more Details

HANDLES 16 x 7-INCH CORES: Therm-Monic M-285AD core baking tunnel, announced by Induction Heating Corp., Brooklyn, N. Y., has a capacity of 375 pounds of cores per hour and is capable of handling cores up to 16 inches wide by 7 inches high. It has a variable speed dial feed, adjustable electrodes and a complete blower exhaust system.

Check No. 21 on Reply Card for more Details

PREVENTS LEAKS AROUND SHAFT: For installation on equipment, moving or transferring liquids, which requires a positive shaft seal, Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles 31, Calif., has developed a new mechanical shaft seal to provide a mechanical means for prevention of leaks around a rotating shaft. Seals available in three classifications—standard, abrasive-resistant, special.

Check No. 22 on Reply Card for more Details

FOR OIL OR OIL VAPOR SERVICE: Electro hydraulic solenoid valves, offered by Hoppe Engineering Co., Greensboro, Ind., are suitable for oil or oil vapor service on temperatures up to 1000° F and for steam, water, air, gas and general service on temperatures up to 850° F. Valves operate from a 6 v storage battery and are available in sizes from ½ to 2 inches, screwed or flanged.

Check No. 23 on Reply Card for more Details

CARBIDE TIPPED LATHE CENTERS: Lathe centers with 60 degree tungsten carbide tips are introduced by South Bend Lathe Works, South Bend 22, Ind., for use on lathes, grinders and other machine tools. They are available with standard No. 2 and No. 3 Morse taper shanks.

Check No. 24 on Reply Card for more Details

TAKES 1500 PSI SURGE: Cook Electric Co., Chicago 14, Ill., offers the Hydtrol medium pressure switch. It weighs 22 ounces and takes 1500 psi surge without calibration change. The operating range is adjustable from 10 to 500 psi.

Check No. 25 on Reply Card for more Details

MOLDED AT LOW PRESSURE: Designated as ARD-Lustrex 15 K, a new pattern plastic for use in precision casting is introduced by A. R. D. Corp., New York 5, N. Y. It can be molded in cast molds and at low pressures and has strength, rigidity and stability. In drying and firing no mold cracks will result due to the controlled expansion properties.

Check No. 26 on Reply Card for more Details

CLEANS MECHANICAL PARTS: For cleaning motor blocks, piston, clutches, transmissions, carburetors and other parts, Wilkinson Mfg. Co., Omaha, Neb., offers a new degreaser. Cleansing action is accomplished by flooding parts with a new inexpensive chemical detergent.

Check No. 27 on Reply Card for more Details

DUST COLLECTING SYSTEM: Model 331D Dustkop dust collector is for small-wheel grinding, buffing, polishing, etc. Rated in excess of 300 cfm, suction is supplied by a paddle wheel fan direct driven by a ¼-hp continuous duty motor. It is made by Aget-Detroit Co., Ann Arbor, Mich.

Check No. 28 on Reply Card for more Details

ILLUMINATOR FOR MICROSCOPE: Buhl Optical Co., Pittsburgh 12, Pa., announces a special illuminator for use with its S-129 pocket microscope. Using a standard-size flashlight battery and bulb, illuminator directs an oblique beam of light on the observed surface. It is attached to the microscope tube by a heavy spring clip.

Check No. 29 on Reply Card for more Details

DRAFTING MACHINE: V. & E. Mfg. Co., Pasadena, Calif., offers a drafting machine with a sturdy spring counterpoise attached to support bracket that permits unit to function smoothly on drawing board tilted from 0 to 20 degrees. The Vemco Versatilt has an indexing mechanism for setting off 15 degree positions.

Check No. 30 on Reply Card for more Details

CHARGES TRUCK BATTERIES: Motor Generator Corp., Troy, O., announces a new Universal battery charger for charging any type of industrial truck batteries. It is designed to charge 200 to 500 amp hour lead-acid batteries of 12, 15, 16 and 18 cell capacity, and/or 150 to 450 amp hour nickel-iron batteries of 20, 24 and 30 cell capacity.

Check No. 31 on Reply Card for more Details

FOR ATTACHING PARTS TO PANELS: A new blind fastener known as the bolt-retaining Speed Clip, for attaching small parts and accessories to metal panels, is introduced by Tinnerman Products Inc., Cleveland, O. It is a single unit consisting of a special square-headed bolt held in position by a steel clip which permits entire assembly to be made from one side only.

Check No. 32 on Reply Card for more Details

MACHINING HIGH TENSILE CAST IRON: No. 905 grade of cemented carbide, used for finishing and light roughing cuts on nonferrous metals and cast irons with hardness up to Brinell 550, is announced by Carboloy Co. Inc., Detroit, Mich. It gives higher hardness, more wear resistance and a rapid dissipation of heat to the cutting edge.

Check No. 33 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

WITH steelmaking operations booming along at highest level since June, fair supply-demand balance in most products is predicted in early first quarter. Except for light, flat-rolled items and pipe, no prolonged supply pinches threaten. Even in sheets and strip, which are sold out for months, tight supply after the turn of the year depends on automotive requirements. Should these materially slacken, the position of other flat-rolled consumers would improve correspondingly. Meanwhile, the steel markets are strong with prices definitely headed upward. Several isolated increases were effected last week.

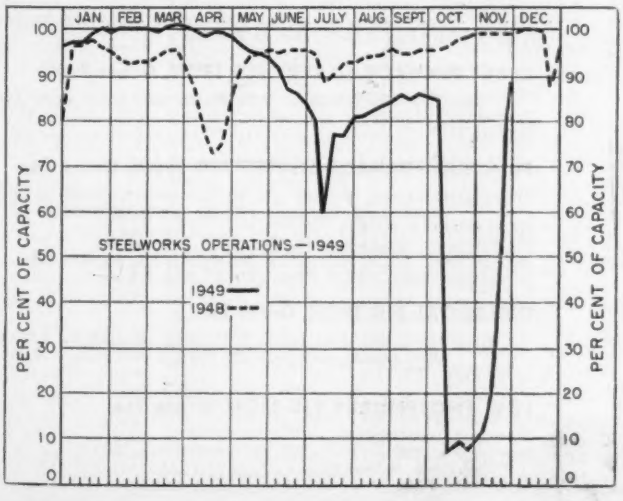
PRODUCTION—Resumption of soft coal mining on a three-day per week basis after the abortive mine suspension last week removes any immediate threat to high-level steelmaking operations. Mill fuel inventories are sufficient to support active production well into the first quarter. Last week the national ingot rate advanced another 9½ points to 89.5 per cent of capacity. Not only is this the fastest pace attained in about six months, but it marks more rapid recovery from the steel strike than generally had been expected.

DEMAND—Consumers are pressing for shipments against old orders. Metalworking shops are seeking to replenish depleted and unbalanced inventories as quickly as possible. But new buying is sluggish in most directions. Caution in ordering is increasingly in evidence. Even the warehouses report disappointing volume. Currently, chief market emphasis is on sheets and strip. Larger buyers, such as automotive interests, are pressing actively for tonnage. Smaller fabricators, whose lines are not moving too well in some cases, are somewhat less insistent for tonnage and they are ordering conservatively. Most sheet sellers are booked through first quarter, several through June, but openings in tight rolling schedules may appear as time passes. Carryovers into first quarter will be substantial in all light flat products, including stainless sheets and strip.

OTHER PRODUCTS—Pipe is in almost as critical position as sheets and no particular easing in requirements appears in prospect. Relatively little new structural tonnage is coming out though a promising volume of new work is shaping up for action early next year. Plates are moving well but new buying is relatively slow. Tonnage, especially in the heavier gages, is available for shipment before yearend. New requirements for hot carbon bars are easing, warehouses and cold drawers being among most active buyers. Forgers, many of which are operating no more than 40 per cent of capacity, are showing little interest. Merchant pig iron demand is spotty. Production of iron is back to normal. October pig iron output was only 602,259 tons, bringing the total for the first 10 months to 45,738,627 tons, exclusive of ferromanganese and spiegeleisen.

PRICES—Scattered upward price adjustments on several products were effected during the week. These are considered straws in the wind, but no sweeping revisions in price schedules appear imminent. A maker of silicon sheets raised prices $35 per ton. A wiremaker upped the price on one grade of wire $5, while two producers of galvanized sheets effected increases of $5 and $6.

COMPOSITES—The isolated increases on finished steel products, while significant, were not sufficiently widespread to affect the general market. STEEL's weighted index on finished steel held at 152.52 and the arithmetical composite at $91.64. Steelmaking scrap composite slipped to $29.17 from $29.83 the week preceding. Pig iron composites were steady as follows: No. 2 foundry, $46.10; malleable, $47.27; basic, $45.60.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Dec. 3	Change	Same Week 1948	Same Week 1947
Pittsburgh	84	+ 5*	95.5	102.5
Chicago	88.5	+ 9.5*	99.5	95
Eastern Pa.	82	+ 2	97	93.5
Youngstown	95	+ 5	105	100
Wheeling	99	None	97	93.5
Cleveland	101.5	+ 3.5*	102	88.5
Buffalo	101	None	104	88.5
Birmingham	100	+38	100	103
New England	89	+ 2	90	85
Cincinnati	70	+10	103	87
St. Louis	84.5	— 2.5	89.5	87
Detroit	101	None	100	92
Western	82	+11	..	..
Estimated national rate	89.5	+ 9.5	100	97.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Change from revised rate.

Composite Market Averages

	Dec. 1 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$91.64	$91.64	$91.64	$95.50	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	29.17	29.83	28.00	43.25	18.33

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 1 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh ...	3.35	3.35	3.35	3.35–55	2.15
Bars, H.R., del. Phila. ...	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh ...	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C. F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40–60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa. ..	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh ..	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh ..	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25–70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh...	4.00	4.00	4.00	4.00–75	2.80
Strip, C.R., Chicago	4.00–15	4.00–15	4.00–15	4.00–25	2.90
Strip, C.R., Detroit	4.20–25	4.20–25	4.20–25	4.20–50	2.90
Wire, Basic, Pittsburgh ...	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh ...	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh.	$7.75	$7.75	$7.75	$6.70	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–57.00	51.78–57.00	51.78–52.00	67.00	34.00
Wire rods, $\frac{7}{32}$-⅜", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham ..	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	135.00*

* Delivered, duty paid.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts. ..	$32.00	$33.50	$29.50	$42.75	$20.50
No. 1 Heavy Melt. E. Pa. .	26.00	26.50	25.00	45.25	18.00
No. 1 Heavy Melt. Chicago	29.50	29.50	29.50	41.75	19.50
No. 1 Heavy Melt. Valley...	32.75	32.75	29.25	42.75	17.25
No. 1 Heavy Melt. Cleve...	30.25	30.25	26.50	42.25	15.25
No. 1 Heavy Melt. Buffalo.	29.75	29.75	27.25	48.50	18.75
Rails, Rerolling, Chicago..	44.50	44.50	44.50	71.50	22.25
No. 1 Cast, Chicago.....	42.50	42.50	41.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl. .	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.75	15.75	15.75	17.00	7.75
Oven Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	17.62½-18.50	23.50	12.00
Zinc, E. St. Louis	9.75	9.75	9.75	17.50	8.25
Lead, St. Louis	11.80	11.80	12.80	21.30–35	6.35
Tin, New York	83.00	85.00	94.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	32.00	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Cincinnati,del.	....	46.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb, piglets, frt. allowed K2..	82.00
Wenatchee,Wash, OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.09
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Dec. 1, 1949; cents per pound unless otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Detroit R7 .....$50.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)

Detroit R7 .....$51.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ...51.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer,Pa. C3 .....$52.00
Clairton,Pa. C3 .....52.00
Conshohocken,Pa. A3 ..57.00
Ensley,Ala. T2 .....52.00
Fairfield,Ala. T2 .....52.00
Fontana,Calif. K1 ....71.00
Gary,Ind. C3 .....52.00
Johnstown,Pa. B2 .....52.00
Lackawanna,N.Y. B2 ..52.00
Munhall,Pa. C3 .....52.00
Sharon,Pa. S3 .....57.00
So.Chicago,Ill. C3 .....52.00
So.Duquesne,Pa. C3 ...52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 .....$61.00
Buffalo R2 .....61.00
Canton,O. R2 .....61.00
Clairton,Pa. C3 .....61.00
Cleveland R2 .....61.00
Conshohocken,Pa. A3 ..63.00
Detroit R7 .....61.00
Ensley,Ala. T2 .....61.00
Fairfield,Ala. T2 .....61.00
Fontana,Calif. K1 .....80.00
Gary,Ind. C3 .....61.00
Geneva,Utah G1 .....61.00
Houston,Tex. S5 .....69.00
Ind. Harbor,Ind. I-2 ...61.00
Johnstown,Pa. B2 .....61.00
Lackawanna,N.Y. B2 ..61.00
Munhall,Pa. C3 .....61.00
So.Duquesne,Pa. C3 ...61.00
So.Chicago,Ill. C3, R2..61.00
Warren,O. C17 .....61.00

Alloy (NT)

Bethlehem,Pa. B2 ....$63.00
Buffalo R2 .....63.00
Canton,O. R2, T7.....63.00
Conshohocken,Pa. A3 ..65.00
Detroit R7 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Houston,Tex. S5 .....71.00
Johnstown,Pa. B2 .....63.00
Lackawanna,N.Y. B2 ..63.00
Massillon,O. R2 .....63.00
Midland,Pa. C18 .....63.00
Munhall,Pa. C3 .....63.00
Sharon,Pa. S3 .....63.00
So.Chicago,Ill. C3, R2..63.00
So.Duquesne,Pa. C3 ...63.00
Warren,O. C17 .....63.00

SHEET BARS (NT)

Mansfield,O. E6..(GT)$58.00
Portsmouth,O. P12 ....52.00
Sharon,Pa. S3 .....57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00

SKELP

Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.25
Warren,O. R2 .....3.25
Youngstown C3, R2 ....3.25

WIRE RODS

AlabamaCity,Ala. R2 ..3.40
Buffalo W12 .....3.40
Cleveland A7 .....3.40
Donora,Pa. A7 .....3.40
Fairfield,Ala. T2 .....3.40
Houston,Tex. S5 .....3.95
Ind.Harbor,Ind. Y1 ....3.40
Johnstown,Pa. B2 .....3.40
Joliet,Ill. A7 .....3.40
Los Angeles B3 .....4.20
Monessen,Pa. P7 .....3.40
Pittsburg,Calif. C11 ....4.05
Portsmouth,O. P12 ....3.40
So. Chicago,Ill. R2.....3.40
SparrowsPoint B2 .....3.50
Sterling,Ill.(1) N15 ....3.40
Struthers,O. Y1 .....3.40
Torrance,Calif. C11 ....4.20
Worcester,Mass. A7 ....3.70

STRUCTURALS
Wide Flange

Bethlehem,Pa. B2 .....3.30
Lackawanna,N.Y. B2 ...3.30
Munhall,Pa. C3 .....3.20
So.Chicago,Ill. C3 .....3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 .....4.95
Bessemer,Ala. T2 .....4.95
Bethlehem,Pa.(14) B2 ..5.05
Clairton,Pa. C3 .....4.95
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.10
Gary, Ind. C3 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.95
Johnstown,Pa. B2 .....5.05
Lackawna,N.Y.(14) B2 .5.05
Munhall,Pa.(14) C3 ....4.95
So.Chicago,Ill.(14) C3 ..4.95
Struthers,O. Y1 .....4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 .....3.25
Bessemer,Ala. T2 .....3.25
Bethlehem,Pa. B2 .....3.30
Clairton,Pa. C3 .....3.25
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....3.80
Gary,Ind. C3 .....3.25
Geneva,Utah G1 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2 ....3.25
Johnstown,Pa. B2 .....3.30
KansasCity,Mo. S5 .....3.85
Lackawanna,N.Y. B2 ...3.30
LosAngeles B3 .....3.85
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.25
Niles,Calif.(22) P1 ....3.97
Portland,Oreg. O4 .....3.90
Seattle B3 .....3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 ....3.80
Torrance,Calif. C11 ....3.85
Weirton,W.Va. W6 .....3.25

Alloy Stand. Shapes

Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 ....4.05
Lackawanna,N.Y. B2 ...4.05
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
Weirton,W.Va. W6 .....4.05

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Ashland,Ky.(15) A10 ...3.40
Bessemer,Ala. T2 .....3.40
Clairton,Pa. C3 .....3.40
Claymont,Del. W16 ....3.50
Cleveland J5, R2 .....3.40
Coatesville,Pa. L7 .....3.50
Conshohocken,Pa. A3 ...3.50
Ecorse,Mich. G5 .....3.65
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Harrisburg,Pa. C5 .....3.75
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2, Y1.3.40
Johnstown,Pa. B2 .....3.40
Lackawanna,N.Y. B2 ...3.40
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.40
Pittsburgh J5 .....3.40
Seattle B3 .....4.30
Sharon, Pa. S3 .....3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 ..3.40
Steubenville,O. W10 ....3.40
Warren,O. R2 .....3.40
Weirton,W.Va. W6 .....3.40
Youngstown C3, Y1 ....3.40

PLATES (Universal Mill)

Fontana,Calif. K1 .....4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ...4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.15
Cleveland,cl R2 .....3.65
Warren,O.,cl R2 .....3.65

PLATES, Wrought Iron

Economy,Pa. B14 .....7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland J5, R2 .....5.20
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.45
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....5.80
Gary,Ind. C3 .....5.20
Geneva,Utah G1 .....5.20
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 .5.20
Johnstown,Pa. B2 .....5.20
Munhall,Pa. C3 .....5.20
Pittsburgh J5 .....5.20
Sharon,Pa. S3 .....5.65
So.Chicago,Ill. C3 .....5.20
SparrowsPoint,Md. B2 ..5.20
Warren,O. R2 .....5.20
Youngstown Y1 .....5.20

FLOOR PLATES

Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ...3.35
Aliquippa,Pa. J5 .....3.35
Alton,Ill.(1) L1 .....3.35
Ashland,Ky. (17) A10...3.35
Atlanta,Ga. A11 .....3.50
Bessemer,Ala. T2 .....3.35
Buffalo R2 .....3.35
Canton,O. R2 .....3.35
Clairton,Pa. C3 .....3.35
Cleveland R2 .....3.35
Ecorse,Mich. G5 .....3.55
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1.3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Marion,O. P11 .....3.35
Midland,Pa. C18 .....3.35
Milton,Pa. B6 .....3.35
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.05
N.Tonawanda,N.Y. B11 .3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.10
S.Chicago C3, R2, W14..3.35
So.Duquesne,Pa. C3 ....3.35
S.SanFran.,Cal. B3 ....4.10
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Weirton,W.Va. W6 .....3.35
Youngstown C3, R2 ....3.35

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....3.35
Atlanta,Ga. A11 .....3.50
Bethlehem,Pa.(2) B2 ...3.55
Johnstown,Pa. B2 .....3.35
Lackawanna,N.Y. B2 ...3.35
Niles,Calif. P1 .....4.05
Pittsburgh(23) J5 .....3.35
Portland,Oreg. O4 .....4.10
SanFrancisco S7 .....4.05
Weirton,W.Va. W6 .....3.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....3.75
Buffalo R2 .....3.75
Canton,O. R2, T7 .....3.75
Clairton,Pa. C3 .....3.75
Ecorse,Mich. G5 .....4.05
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....3.75
Houston,Tex. S5 .....4.15
Ind.Harbor,Ind. I-2, Y1.3.75
Johnstown,Pa. B2 .....3.75
KansasCity,Mo. S5 .....4.35
Lackawanna,N.Y. B2 ...3.75
LosAngeles B3 .....4.80
Massillon,O. R2 .....3.75
Midland,Pa. C18 .....3.75
S.Chicago C3, R2, W14..3.75
So.Duquesne,Pa. C3 ....3.75
Struthers,O. Y1 .....3.75
Warren,O. C17 .....3.75
Youngstown C3 .....3.75

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 .....4.00
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....4.00
Youngstown C3 .....4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.10
Bessemer,Ala. T2 .....5.10
Bethlehem,Pa. B2 .....5.10
Clairton,Pa. C3 .....5.10
Cleveland R2 .....5.10
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.10
Fontana,Calif. K1 .....6.15
Gary,Ind. C3 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ...5.10
Pittsburgh J5 .....5.10
So.Duquesne,Pa. C3 ....5.10
Struthers,O. Y1 .....5.10
Youngstown C3 .....5.10

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 .....4.00
Ambridge,Pa. W18.....4.00
BeaverFalls, M12, R2...4.00
Buffalo B5 .....4.00
Camden,N.J. P13 .....4.48
Carnegie,Pa. C12 .....4.00
Chicago W18 .....4.00
Cleveland A7, C20.....4.00
Cumberland,Md. C19 ...3.95
Donora,Pa. A7 .....4.00
Ecorse,Mich. G5 .....4.30
Elyria,O. W8 .....4.00
FranklinPark,Ill. N5 ...4.00
Gary,Ind. R2 .....4.00
Hammond,Ind. L2, M13.4.00
Hartford, Conn. R2 ....4.40
Harvey,Ill. B5 .....4.00
Indianapolis M13 .....4.20
LosAngeles R2 .....5.40
Mansfield,Mass. B5 ....4.40
Massillon,O. R2, R8....4.00
Midland,Pa. C18 .....4.00
Monaca,Pa. S17 .....4.00
Newark,N.J. W18 .....4.40
Plymouth,Mich. P5 .....4.25
Pittsburgh J5 .....3.95
Putnam,Conn. W18 ....4.40
Readville,Mass. C14 ...4.40
St.Louis,Mo. M5 .....4.35
So.Chicago,Ill. W14 ....4.00
SpringCity,Pa.(5) K3 ..4.48
Struthers,O. Y1 .....4.00
Waukegan,Ill. A7 .....4.00
Youngstown F3, Y1.....4.00

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 .....4.65
Ambridge,Pa. W18 .....4.65
BeaverFalls,Pa. M12....4.65
Bethlehem,Pa. B2 .....4.65
Buffalo B5 .....4.65
Canton,O. R2, T7.....4.65
Carnegie,Pa. C12 .....4.65
Chicago W18 .....4.65
Cleveland A7, C20.....4.65
Donora,Pa. A7 .....4.65
Elyria,O. W8 .....4.65
Gary,Ind. R2 .....4.65
Hammond,Ind. L2, M13.4.65
Hartford,Conn. R2 .....4.95
Harvey,Ill. B5 .....4.65
Indianapolis M13 .....4.85
Lackawanna,N.Y. B2 ..4.65
Mansfield,Mass. B5 .....4.95
Massillon,O. R2, R8.....4.65
Midland,Pa. C18 .....4.65
Monaca,Pa. S17 .....4.65
Newark,N.J. W18 .....4.95
So.Chicago,Ill. R2, W14.4.65
Struthers,O. Y1 .....4.65
Waukegan,Ill. A7 .....4.65
Worcester,Mass. A7 ....4.95
Youngstown F3, Y1 ....4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ...3.35
Alton,Ill.(6) L1 .....3.35
Atlanta,Ga. A11 .....3.50
Buffalo R2 .....3.35
Cleveland R2 .....3.35
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1 .3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.05
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle,Wash. B3, N14..4.10
So.Chicago,Ill. R2 .....3.35
So.Duquesne,Pa. C3 ....3.35
So.SanFrancisco B3 ....4.10
SparrowsPoint,Md. B2 ..3.35
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Youngstown C3, R2 ....3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ...4.25
LosAngeles B3 .....5.00
Marion,O. P11 .....4.25
Pittsburgh J5 .....4.25
Seattle B3, N14 .....5.00
So.SanFrancisco B3 ....5.00
SparrowsPt., 1⅛-1¼" B2.4.83
SparrowsPt., ¼-1" B2 ..4.25

RAIL STEEL BARS

ChicagoHts.,Ill(3) I-2 ..3.25
FortWorth,Tex.(4) T4 ..4.33
Hntngtn.W.Va.(3) W7 ..3.35
Moline,Ill.(3) R2 .....3.35
Williamsport(2,3) S19 ..3.35
Williamsport(4) S19 ....3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14..9.50
Economy,Pa.(D.R.)B14.11.00
Economy(Stablt) B14 ..11.30
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Hot-Rolled Ingot Iron

Ashland.Ky.(17) A10 ...3.60

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 ..3.25
Ashland,Ky.(8) A10 ....3.25
Butler,Pa. A10 .....3.25
Cleveland J5, R2 .....3.25
Conshohocken,Pa. A3 ...3.35
Ecorse,Mich.(8) G5 ....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....4.15
Gary,Ind. C3 .....3.25
Ind.Harbor,Ind. I-2, Y1..3.25
Irvin,Pa. C3 .....3.25
Kokomo,Ind. C16 .....3.35
Lackawanna,N.Y. B2 ...3.25
Munhall,Pa. C3 .....3.25
Niles,O. M4 .....3.25
Pittsburg,Calif. C11 ....3.95
Pittsburgh J5 .....3.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
SparrowsPoint,Md. B2 ..3.25
Steubenville,O. W10 ....3.25
Torrance,Calif. C11 ....3.95
Warren,O. R2 .....3.25
Weirton,W.Va. W6 .....3.25
Youngstown C3, Y1 ....3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 ...4.40
Dover,O. R1 .....5.00
Fairfield,Ala. T2 .....4.15
Ind.Harbor,Ind. I-2 ....4.15
Kokomo,Ind. C16 .....4.25
Mansfield,O. E6 .....4.15
Niles,O. N12, M4 .....4.15
Torrance,Calif. C11 ....5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.00
Cleveland J5, R2 .....4.00
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.00
Follansbee,W.Va. F4 ....4.00
Fontana,Calif. K1 .....4.90
Gary,Ind. C3 .....4.00
GraniteCity,Ill. G4 .....4.20
Ind.Harbor,Ind. I-2, Y1.4.00
Irvin,Pa. C3 .....4.00
Lackawanna,N.Y. B2 ..4.00
Middletown,O. A10 ....4.00
Niles,O. M4 .....4.00
Pittsburg,Calif. C11 ....4.95
Pittsburgh J5 .....4.00
SparrowsPoint,Md. B2 ..4.00
Steubenville,O. W10 ....4.00
Warren,O. R2 .....4.00
Weirton,W.Va. W6 .....4.00
Youngstown Y1 .....4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 .....6.95
Gary,Ind. C3 .....6.05
Ind.Harbor,Ind. I-2, Y1.6.05
Irvin,Pa. C3 .....6.05
Lackawanna,N.Y. B2 ..6.05
Pittsburgh J5 .....6.05
Sharon,Pa. S3 .....6.05
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 .....6.05
Youngstown Y1 .....6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	*5.65*
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	*4.80*
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance, Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu FE
Ashland A10	5.00	...
Canton,O. R2	5.05	5.50
Fairfield,Ala. T-2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	...	7.70	8.45	9.25
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	5.15	5.45	5.95	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	7.20	7.70	8.45	9.25
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	9.80	10.35	11.05	11.85
Toronto,O. F4	9.80	10.35	11.05	11.85
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, ZINCGRIP No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.40
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2.	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill G4.	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B11	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa, Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa.(25) S3	3.25
Sharon,Pa.(9) S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Carbon

Berea,O. C7	6.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit, D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I-2	4.00
Lackawanna,N.Y. B2	4.00
LosAngeles C1	5.00
Mattapan,Mass.(21) T6	4.50
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
NewCastle,Pa. B4, E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
Riverdale,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-Rolled, High-strength Low-Alloy

Cleveland A7, J5	6.05
Dover,O. G6	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna,N.Y B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.00
Youngstown C8	4.00

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40c	0.40-0.60c	0.60-0.80c	0.80-1.05c	1.05-1.35c
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewCastle,Pa. E5	4.00	5.50	6.10	8.05	10.35
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8 Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	6.30	6.90	8.85	11.15
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass, T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold-Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cld.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Col. Steel & Shafting Co.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Co.
D4 Disston & Sons,Henry
D6 Driver Harris Co.

E1 Eastrn.Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliot Bros. Steel Co.
E6 Empire Steel Co.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.
H6 Hind Steel Co.Inc.

I-1 Igoe Bros.Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Cleveland J5	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, Cold-Rolled Flat

Chicago T6	5.35
Cleveland A7	5.00
Dover,O. G6	5.00
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.00
Massillon,O. R8	5.00
Monessen,Pa. P7	5.00
Pawtucket,R.I.(11) N8	5.55
Pawtucket,R.I.(12) N8	5.50
Trenton,N.J. R5	5.80
Worcester,Mass. A7	5.30
Worcester,Mass. T6	5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4	7.70
Buffalo W12	7.70
Chicago W13	7.70
Cleveland A7	7.70
Fostoria,O. S1	8.20
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	7.70
Palmer,Mass. W12	8.00
Portsmouth,O. P12	7.70
Struthers,O. Y1	7.70
Trenton,N.J. R5	8.50
Waukegan,Ill. A7	7.70
Worcester, Mass. A7, T6	8.00

WIRE (16 gage)	An'ld. Galv. Stone	Galv. Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4	9.05	10.55
Cleveland A7	9.05	10.55
Fostoria,O. S1	*9.65*	*11.15*
Jonnstown B2	9.05	10.55
Kokomo C16	9.05	10.10
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	9.40	10.90
Prtsmth.(18) P12	9.05	10.55
SparrowsPt. B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill.(1) L1	4.15
Bartonville,Ill.(1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Fostoria,O.(24) S1	4.65
Houston S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Minnequa,Colo. C10	4.50
Monessen,Pa. P7	4.15
Newark,6-8ga. I-1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill.(1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7, T6	4.45

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Bartonville,Ill.(19) K4	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Fostoria,O. S1	6.05
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Milbury,Mass.(12) N6	5.85
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7	5.85
Trenton,N.J. R5	6.35
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Buffalo W12	7.50	7.80	8.20
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	8.00	8.30	8.70
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Palmer,Mass. W12	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.60
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	8.00	8.30	8.70
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.50	7.80	8.20

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.,City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Buffalo W12	4.80	...
Cleveland A7	4.80	5.25
Crawfrdvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Palmer,Mass. W12	5.10	...
Pitts.,Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1)N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill.(1) L1	5.20
Buffalo W12	5.20
Cleveland A7	5.20
Donora, Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
NewHaven,Conn. A7	5.50
Palmer,Mass. W12	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Jonnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

FENCE POSTS

	Col.
Duluth A7	112
Huntington,W.Va. W7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19..n.t.	$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2	175
AlabamaCity,Ala. R2	109
Aliquip.,Pa 9-14½ga. J5	109
Atlanta A11	111
Bartonville,Ill.(19) K4	109
Crawfordsvll,Ind. M8	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga.,6" B2	183
Johnstn,17ga.,4" B2	186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12	109
Rankin, Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	106
Atlanta A11	107
Bartonville,Ill.(19) K4	106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran., Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Stock (To Dealers & Mfrs.)

AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Cleveland A9	110
Crawfordsvile M8	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa,Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

NAILS & STAPLES, Stock (To Jobbers)

Chicago,Ill. W13	103
Minnequa,Colo. C10	107
Portsmouth,O. P12	100

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Bartonville,Ill.(19) K4	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa,Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I-2	4.05
Lackawanna,N.Y. B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I-2	4.25
Joliet,Ill. C3	4.25
Lackawanna,N.Y. B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS

	(20)Treated
Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I-2, Y1	5.35
Kansas City, Mo. S5	5.60
Lebanon,Pa. B2	5.35
Minnequa,Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Williamsport,Pa. S19	3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal-Cyclops Steel
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Corp.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn. Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi.-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(8) 16 gage and heavier.
(9) 6" and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Wider than 6".

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) L1; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ⅛" through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 in., inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Carbon Base Both Sides	Sheets Copper Base
302	....	....	....	19.75	21.50	75.00	
304	22.50	26.50	....	20.75	22.50	77.00	
305	....	....	....	....	....	79.00	
309	27.00	31.00	....	....	....	....	
310	32.50	36.50	....	....	....	105.00	
316	27.00	31.00	....	26.00	28.00	....	
317	30.50	34.50	....	....	....	....	
318	29.50	33.50	....	....	....	....	
321	23.50	27.50	....	23.00	25.00	90.00	
347	25.00	29.00	....	24.00	26.00	94.00	
405	18.75	24.75	....	....	....	....	
410	18.25	24.25	....	....	....	....	
430	18.25	24.25	....	....	....	....	
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized. † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long 35
⅝ & ¾ x 6 in., shorter. 37
⅞-in. & larger x 6 in., shorter 34
All diameters longer than 6-in. 30
Tire bolts 25
Plow bolts 47
Lag bolts, 6 in., shorter 37
Lag bolts, longer than 6 in. 35

NUTS

Semifinished hexagon	A.S. Reg. & Light	Heavy
⅞-in., smaller	41 off	.....
⅞-in., smaller	....	38 off
½-in.-1-in.	39 off	.....
⅛-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in., larger	34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller..51 off
¾, ⅞, & 1 x 6-in. & shorter .....35 off
Headless, ¼-in., larger.31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
⅞-in., under .....48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	84,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge, Pa., sheets A4.
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk, N. Y., bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 309 quoted 51.00 A4.
Youngstown, strip C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 20.00
Toluol, one deg...19.00-23.50
Industrial xyloi ..20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	65.00-130.00
Aluminum:	
1500-lb lots, freight allowed	29.00
Atomized, 500-lb drums, freight allowed	30.50
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	28.625
Reduced	27.75
Lead	19.25
Manganese:	
Minus 100 mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Zinc, 10-ton lots	15.50-18.25
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, 1000 lb and over	2.90
500 to 1000 lb	2.95
less than 500 lb	3.05
98.8%, minus 65 mesh, freight allowed, 1000 lb and over	2.90
less than 1000 lb	3.05
Tin	1.075
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.50
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic, 99% Cr min.	3.50

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvil, fur. $13.00-13.50
Connellsvil, fdry 15.50-16.00
New River, foundry....18.00
Wise county, foundry..15.35
Wise county, furnace..14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens.$22.00
Everett, Mass., ovens ....
New England, del.‡..22.70
Chicago, ovens 20.00
Chicago, del. .....†21.45
Detroit, del. 23.91
Terre Haute, ovens....20.20
Milwaukee, ovens 20.75
Indianapolis, ovens....19.85
Chicago, del. 23.32
Cincinnati, del. 22.77
Detroit, del. 23.75
Ironton, O., ovens 19.40
Cincinnati, del. 21.63
Painesville, O., ovens..20.90
Buffalo, del. 23.02
Cleveland, del. 22.62
Erie, del. 21.04
Birmingham, ovens 17.70
Philadelphia, ovens 20.45
Swedeland, Pa., ovens.20.40
Portsmouth, O., ovens.19.50
Detroit, ovens 20.65
Detroit, del. *21.70
Buffalo, del. 22.95
Flint, del. 23.00
Pontiac, del. 21.98
Saginaw, del. 23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75**	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse).	5.32	6.22**	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
Milwau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[5]	6.64	5.39	5.59	7.04
St. L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[5]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco..	6.15[10]	7.50[9]	7.80	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[3]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[7]‡	8.15[8]	8.80	6.70[7]	...	6.20[7]	8.15[8]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [3]—1500 lb and over; [4]—1000 to 1999 lb; [5]—1000 to 4999 lb; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ¾" grains; Bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot:	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	18.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8: 1	$35.00
48% 3:1	37.50
48% no ratio	28.50-29.00
South African Transvaal	
44% no ratio	$19.00-20.00
45% no ratio	19.50-21.00
48% no ratio	27.00-28.00
50% no ratio	28.50-29.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	37.50
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

Manganese Alloys

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 179)

Government To Acquire Aluminum

Munitions Board lists primary pig aluminum as strategic and critical, paving way for stockpiling. Purchases to be delayed until after June 1. Tin prices continue to drop

New York—Munitions Board has added primary aluminum to the list of strategic and critical materials to be purchased for the national stockpile. No purchases are planned for the 1950 fiscal year, since stockpile requirements of the metal for this period are expected to be met with delivery from the General Services Administration.

The board's action was taken to provide an adequate initial supply for essential civilian and military needs in an emergency. Bauxite has been on the strategic material list for some time.

Domestic production of primary aluminum dropped to 49,742 net tons in September from 52,001 tons in August and compares with 53,255 tons in September, 1948, reports the Bureau of Mines. September output was at the lowest level since June, 1948. The reduction plant of Reynolds Metals Co. at Jones Mills, Ark., has remained idle since early in August because of a strike. A decline of 22 per cent in sales during September caused inventories of pig aluminum at reduction plants to increase to 53,597 tons on hand Sept. 30.

Tin—Arrival of Straits tin here late last week resulted in the metal being available for spot delivery at 83.00c a pound. Reconstruction Finance Corp. reduced its selling price for Grade A tin 2 cents a pound to 83.00c, New York, for spot delivery, effective Dec. 1. This is the third change in the price of government-owned tin since the industry was permitted to buy the metal on the open market. The 83-cent price represents a decline of 20 cents a pound from the $1.03 figure that American consumers had to pay the RFC from June 1, 1948, to Sept. 24, 1949.

Copper—Inquiry for January copper indicates deliveries that month again will be at a high rate. Wire mills continue to be among most active buyers and are using wire bars as fast as received. They have been unable to replenish working stocks which are below safe levels. A very little metal is available from mine producers for December delivery. A generator breakdown at one of the leading eastern refineries will result in a sharp curtailment in the near-by supply of copper cathodes.

Fabricators' stocks of refined copper increased to 317,829 tons during October from 316,415 tons at the end of September. Consumption totaled 106,928 tons while receipts from producers totaled 108,192 tons. Fabricators' total stocks and purchases amount to 117,227 tons while unfilled orders amount to 174,636 tons, indicating a deficit of 57,409 tons as of Oct. 31.

Brass and bronze ingot prices were somewhat lower last week following a further decline in red metal scrap prices.

Lead—Decline in lead prices to the 11.80-cent St. Louis basis on Nov. 21 has failed to stimulate buying interest, although the turnover last week showed a little improvement. Large consumers are still acquiring tonnages only as needed, apparently on the belief that domestic production plus imports assure them adequate supplies for the near future. Imports of Yugoslavian lead totaled around 20,000 tons for the first 11 months of this year. Another factor contributing to the slow demand is the decline in consumption of lead in the battery industry and the latter's desire to hold inventories down.

Zinc—Only a moderate volume of business is being booked in the zinc market, prices holding steady at 9.75c, East St. Louis, for prime western. Consumption of zinc in August reached the highest level of the year, increasing 40 per cent to 68,338 tons, reports the Bureau of Mines.

STEEL's Metal Price Averages for Nov., 1949

(Cents per pound)

Electrolytic Copper, del. Conn.	18.427
Lead, St. Louis	12.348
Prime, Western Zinc, E. St. Louis	9.760
Straits Tin, New York	89.823
Primary Aluminum Ingots, del.	17.000
Antimony, f.o.b. Laredo, Tex.	32.000
Nickel, f.o.b. refinery	40.000
Silver, New York	73.250

Tin, Lead Futures Trading

New York—Trading in tin and lead futures on the New York Commodity Exchange may be resumed early in 1950. Metal Trade Group of the Exchange, which consists of five members of the Exchange's Board of Governors, has adopted a resolution recommending that trading in these metals be resumed at an early date.

Predicts Heavy Copper Needs

New York—Consumption of copper is exceeding supply by some 26,000 tons a month, declares C. Donald Dallas, chairman of the board, Revere Copper & Brass Inc., this city. He predicts continuance of heavy requirements for industry and stockpiles.

Mr. Dallas emphasizes the common interest of producers and fabricators in encouraging increased consumption of copper. This, he declares, requires an ample supply of copper at competitive prices, which would be possible only if the metal continued to be freely imported.

Mr. Dallas set forth his position in a letter urging earliest possible assurance to the copper industry that suspension of the copper import tax would be continued by Congress. In default of such action by Congress, the duty on copper, two cents a pound under the reciprocal trade agreements, will automatically be reimposed after June 30, 1950.

Events, Mr. Dallas points out, have completely vindicated the position of the tariff opponents as presented to Congress. Whereas in support of the tariff it was predicted that consumption would level off at 62,500 tons a month, actual September-October needs were about 120,000 tons.

World Tin Control Proposed

New York—Revival of the "Tin Buffer Stock Pool" is being proposed by the working party committee to the International Tin Study Group, according to unofficial reports originating in Brussels. The pool was part of prewar methods of tin control instituted by member producing nations to prevent sharp fluctuations in prices. Production had been controlled by export quotas set periodically for each producing country.

Its reinstitution would mean the accumulation of tin reserves for the "pool" which would be administered by the world's principal producing and consuming nations. Under the "buffer pool" plan, tin put on the market in excess of demand would be placed in the buffer stock. On the other nand, should demand exceed the supply the deficit would be taken from the buffer stock.

The proposed plan also includes a recommendation that any United States government stockpiling purchases would be made from the buffer stock instead of through normal marketing channels. It was pointed out that this method of acquisition would help prevent any sharp fluctuations in the market prices for tin.

Tin Restrictions Lifted

Washington—Restrictions on imports, distribution and inventories of pig tin will be removed Dec. 1. The Department of Commerce has announced a revision of its basic tin allocations order M-43 which will eliminate all controls except reporting requirements.

Officials said the action was taken because supplies of pig tin are adequate to meet needs of industry and of the strategic stockpile.

Previous reports to the government on form ODC-412 will still be required of all persons who use 1000 pounds or more of pig tin in any one month; all persons who had in inventory, or under their control, on first day of any month, of 2000 pounds or more of pig tin; all producers, distributors and importers who have any transactions in pig tin in any calendar month.

All importers of pig tin or products containing tin must file with each customs entry a completed form ODC-1040 covering such imports. The proposed disposition of the material should be set forth on form ODC-1040 under "remarks."

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.
Brass Ingot: 85-5-5-5 (No. 115) 17.25-18.25c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.75c; No. 1 yellow (No. 405) 14.25-16.00c.
Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.75c, delivered.
Lead: Common 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.
Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c; grade 3, 16.00-16.25c; grade 4, 15.50-15.75c. Prices include freight at carload rate up to 75 cents per 100 lb.
5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.
Tin: Grade A, prompt delivery, 83.00c; December arrival, 82.75c; January arrival, 78.50c; February arrival, 77.50c; March arrival, 76.75c. Chinese, 99% tin, prompt del., 76.00-78.00c.
RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 83.00c.
Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99% (Chinese, English, Belgium), prompt, 26.00c, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.
Mercury: Open market, spot, New York $72-$74 per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.
Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.
Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 73.25c per oz.
Platinum: $69-72 per ounce.
Palladium: $24 per troy ounce.
Iridium: $100-$110 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95% 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.
Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.
Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.
Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.
Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.30 l.c.l. 23.925, c.l. 23.425; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.35, l.c.l. 26.10, c.l. 25.60; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	17S-T4
0.125	**48.0**	...	...
0.156-0.203	**41.0**	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 1	18.50	11.80	9.75	83.00	17.00	32.00	40.00	73.25
Nov. Avg.	18.427	12.348	9.760	89.823	17.00	32.00	40.00	73.25
Nov. 30	18.50	11.80	9.75	83.25	17.00	32.00	40.00	73.25
Nov. 28-29	18.50	11.80	9.75	84.75	17.00	32.00	40.00	73.25
Nov. 21-26	18.50	11.80	9.75	85.00	17.00	32.00	40.00	73.25
Nov. 18-19	18.50	12.30	9.75	85.50	17.00	32.00	40.00	73.25
Nov. 17	18.50	12.30	9.75	90.00	17.00	32.00	40.00	73.25
Nov. 16	18.50	12.30	9.75	92.00	17.00	32.00	40.00	73.25
Nov. 15	18.50	12.55	9.75	92.50	17.00	32.00	40.00	73.25
Nov. 14	18.50	12.60	9.75	92.00	17.00	32.00	40.00	73.25
Nov. 12	18.50	12.60	9.75–10.00	93.50	17.00	32.00	40.00	73.25
Nov. 10	18.50	12.60	9.75-10.00	93.50	17.00	32.00	40.00	73.25
Nov. 9	18.50	12.80	10.00	94.50	17.00	32.00	40.00	73.25
Nov. 7-8	18.50	12.80	9.75	94.50	17.00	32.00	40.00	73.25
Nov. 3-5	18.50	12.80	9.75	94.00	17.00	32.00	40.00	73.25
Nov. 1-2	17.625	12.80	9.75	94.00	17.00	32.00	40.00	73.25

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00; under 100 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 111.00c, 500 to 999 lb, 111.50c; 200 to 499 lb 112.00c; less than 200 lb, 113.50c; ball, 1000 lb and over, 113.25c; 500 to 999 lb, 113.75c; 200 to 499 lb. 114.25c; less than 200 lb, 115.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 67.9c; 100 or 300 lb drums only, 100 to 500 lb. 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c; 10,000 lb and over, 54.4c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 96.00c; more than 2000 lb, 94.00c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 83.00c; 100 lb kegs 84.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.75; No. 2 copper 13.75; light copper 12.75; composition red brass 12.50; radiators 9.50; heavy yellow brass 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.75; No. 2 copper 13.75; light copper 12.75; refinery brass (60% copper) per dry copper content 12.75-13.00; radiators 8.75-9.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 13.00-13.25; No. 2 12.00-12.25; light copper 11.00-11.25; No. 1 composition red brass 11.00-11.25; No. 1 composition turnings 10.25-10.50; mixed brass turnings 6.75-7.00; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.50-6.75; heavy yellow brass 7.75-8.00; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.25-8.50; cocks and faucets, 9.00-9.25; brass pipe 9.50-9.75.
Lead: Heavy 8.75-9.00, battery plates 4.00-4.25; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.25-9.50.
Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.
Tin: No. 1 pewter 42.00-42.50; block tin pipe 63.00-63.50, No. 1 babbitt 30.00-30.50.
Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Dec. 1, 1949; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 1	$29.17
Nov. 23	29.83
Nov. 1949	28.96
Dec. 1948	43.25
Dec. 1944	18.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$32.00*
No. 2 Heavy Melt.	*29.00*
No. 1 Busheling	*32.00*
No. 1 Bundles	*32.00*
No. 2 Bundles	27.00*
No. 3 Bundles	25.00*
Heavy Turnings	24.50-25.00
Machine Shop Turnings	*21.00-22.00†*
Mixed Borings, Turnings	*22.00-23.00†*
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	22.50-23.00
Low Phos. Steel	*33.00-34.00**

Cast Iron Grades*

No. 1 Cupola Cast	*35.00-36.00*
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	33.50-34.00
Axles	36.00-37.00
Rails, Random Length	35.00-36.00
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	*35.50-36.00*
Angles, Splice Bars	32.50-33.50

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$30.00-30.50
No. 2 Heavy Melt. Steel	30.00-30.50
No. 1 Busheling	30.00-30.50
No. 1 Bundles	30.00-30.50
No. 2 Bundles	23.50
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	20.00†
Short Shovel Turnings	20.00†
Cast Iron Borings	20.00†
Bar Crops and Plate	32.00-32.50
Punchings & Plate Scrap	32.00-32.50
Cut Structurals	32.00-32.50

† Nominal.

Cast Iron Grades

No. 1 Cupola	44.00-45.00
Charging Box Cast	37.00-38.00
Stove Plate	38.00-39.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	31.00-32.00
Clean Auto Cast	45.00-46.00
No. 1 Wheels	39.00-40.00
Burnt Cast	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	38.00-39.00
Cast Steel	35.00-36.00
Railroad Specialties	35.00-36.00
Uncut Tires	35.00-36.00
Angles, Splice Bars	41.00-42.00

VALLEY

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	30.50-31.00
No. 1 Bundles	32.50-33.00
No. 2 Bundles	25.00-25.50
Machine Shop Turnings	22.50-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	23.50-24.00
Low Phos.	34.50-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$25.50-26.50*
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.50
No. 1 Bundles	*26.00*
No. 2 Bundles	23.50
Machine Shop Turnings	17.00-18.00
Short Shovel Turnings	19.00
Mixed Borings, Turnings	17.00
Bar Crop and Plate	28.00-29.00
Punchings & Plate Scrap	28.00-29.00
Cut Structurals	28.00
Elec. Furnace Bundles	*26.00-27.00*
Heavy Turnings	*25.00-26.00*
No. 1 Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	*30.00-31.00*
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00-39.00
Malleable	39.00

CINCINNATI

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	29.00
No. 1 Bundles	30.00
No. 2 Bundles	24.00
Machine Shop Turnings	17.00
Short Shovel Turnings	20.00
Mixed Borings, Turnings	18.00
Cast Iron Borings	20.00

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	33.00
Heavy Breakable Cast	36.00
Stove Plate	32.00
Unstripped Motor Blocks	22.00
Brake Shoes	24.00
Clean Auto Cast	42.00
Drop Broken Cast	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	35.00
Rails, Rerolling	40.00
Rails, Random Length	37.00
Rails, 18 in. and under	45.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$25.00-26.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.00-26.00
No. 1 Busheling	28.00-30.00
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings	21.00-22.00
Cast Iron Borings	21.00-22.00
Punchings & Plate Scrap	28.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Heavy Breakable Cast	32.00-33.00
Clean Auto Cast	36.00-37.00

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	25.50-26.00
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Short Shovelings	22.50-23.00
Low Phos.	31.50-32.00

Cast Iron Grades

No. 1 Machinery	*39.50-40.00*
No. 1 Cupola	*36.00-37.00*
Mixed Yard	35.50-36.00
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under.	38.00-39.00
Scrap rails	35.00-36.00
Specialties	35.00-36.00
No. 1 car wheels	36.00-37.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$22.00-23.00*
No. 2 Heavy Melt. Steel	*19.00-20.00*
No. 1 Busheling	*19.00-20.00*
No. 1 Bundles	*22.00-23.00*
No. 2 Bundles	*18.00-19.00*
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings	11.00-12.00
Punchings & Plate Scrap	*22.00-23.00*
Cut Structurals	*22.00-23.00*
Elec. Furnace Bundles	*22.00-23.00*

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery	31.00-32.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	36.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$20.00-21.00*
No. 2 Heavy Melt. Steel	*18.00-18.50*
No. 1 Bundles	*20.00-21.00*
No. 1 Busheling	*18.00-18.50*
Machine Shop Turnings	*12.50-13.00*
Mixed Borings, Turnings	*12.50-13.00*
Short Shovel Turnings	*14.00-14.50*
Bar Crops and Plate	*22.00-22.50*
Punchings & Plate Scrap	*22.00-22.50*
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	*28.00-29.00*
Mixed Cast	*25.00-26.00*
Heavy Breakable Cast	*26.00-27.00*
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	26.00-27.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	24.00-25.00
No. 3 Bundles	16.00-17.00*
Machine Shop Turnings	21.00-22.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings	22.00-23.00
Cast Iron Borings	20.00-21.00
Bar Crops and Plate	31.50-32.50
Punchings	31.50-32.50
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	24.00-25.00
Cut Structurals	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	34.50-35.50
Stove Plate	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*30.00-31.00*
Malleable	37.00-38.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	*37.00-38.00*
Rails, 2 ft. and under.	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Railroad Specialties	35.00-36.00
Angles, Splice Bars	36.00-37.00

* Nominal.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.00
No. 2 Bundles	22.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	30.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R. R. Malleable	nominal
Rails, Rerolling	37.00
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	31.00-33.00

ST. LOUIS

No. 1 Heavy Melt. Steel	*$32.00-33.00*
No. 2 Heavy Melt. Steel	*27.00-28.00*
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	22.00-23.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	32.00-33.00
Clean Auto Cast	40.00-42.00
Burnt Cast	32.00-33.00

Railroad Scrap

R.R. Malleable	31.00-32.00
Rails, Rerolling	40.00-42.00
Rails, Random Lengths	37.00-38.00
Rails, 3 ft. and under	39.00-40.00
Uncut Tires	29.00-30.00
Angles, Splice Bars	37.00-38.00
Railroad Specialties	33.00-34.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$20.00*
No. 2 Heavy Melt. Steel	*18.00*
Nos. 1 & 2 Bundles	*16.00*

Cast Iron Grades

No. 1 Cupola Cast	*30.00-35.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*20.00*
Wheels	*20.00*
Rails, Random Lengths	*20.00*

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	22.00
Cut Structurals	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-27.50
Heavy Breakable Cast.	20.00
Stove Plate	20.00
Unstripped Motor Blocks	18.00
Malleable	20.00
Brake Shoes	18.00
Clean Auto Cast	25.00
No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

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Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades*

Cast	40.00-43.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.

Sheets Strip . . .

Follansbee advances silicon sheet prices $35 per ton. Superior resumes operations

Sheet and Strip Prices, Page 159 & 160 & 161

Cleveland—Lead of Sharon Steel Corp. in raising prices $5 per ton on narrow hot-rolled strip has not been followed by other producers but it has caused some eyebrow lifting. Further it has exerted a strengthening influence throughout the entire steel market which is extending down into consuming lines. Announcement by Follansbee Steel Corp. of an increase of $35 per ton on silicon sheets is expected to lend further strength. In general, however, while demand for the flat-rolled products is strong, no industry-wide change in prices is anticipated before first quarter.

Reeves Steel & Mfg. Co., Dover, O., has increased prices on galvanized sheets $5 per ton to $5.65. The company is sold out on tonnage for first quarter.

Mill order books are loaded through first quarter, in one or two cases through first half. Republic Steel Corp. is allocating tonnage to district offices which in turn are disposing of allotments to customers based on the 1948-49 sales pattern. Allocation is informal.

Shipments are rapidly attaining prestrike pace. Indications are depleted consumer inventories will be pretty well replenished in first quarter. Despite this improved outlook demand continues pressing and in a few instances the mills have returned orders to consumers. Heavy specifying by the automotive industry continues with the auto builders getting ready for another big production year.

Pittsburgh—Follansbee Steel Corp. raised all grades of silicon sheet items produced $35 per ton, effective Nov. 28. Up to late last week other silicon sheet producers had not taken similar action. The increases range from about 17 per cent to about 32 per cent on the various grades. The company says increases were made necessary by the rise in labor and material costs. Order backlogs for silicon sheets and strip are not extended as far as in other flat rolled steel products.

A check among leading steel producers indicates that no significant price action will be taken until early next year, if then. Further improvement in output of hot and cold-rolled strip developed in this area last week. Operations were resumed at Superior Steel Corp., closed by strike since Sept. 21.

Order backlogs of stainless products range between three and four weeks, with stainless strip somewhat more extended. Production emphasis in coming months will be on galvanized and cold-rolled sheets.

Philadelphia — While sheet sellers are well booked ahead, they are watching developments closely, particularly automotive requirements. Such requirements are heavy, but they may not be sustained at the present rate much longer.

The Bethlehem Steel Co. is booked solidly for first quarter on hot and

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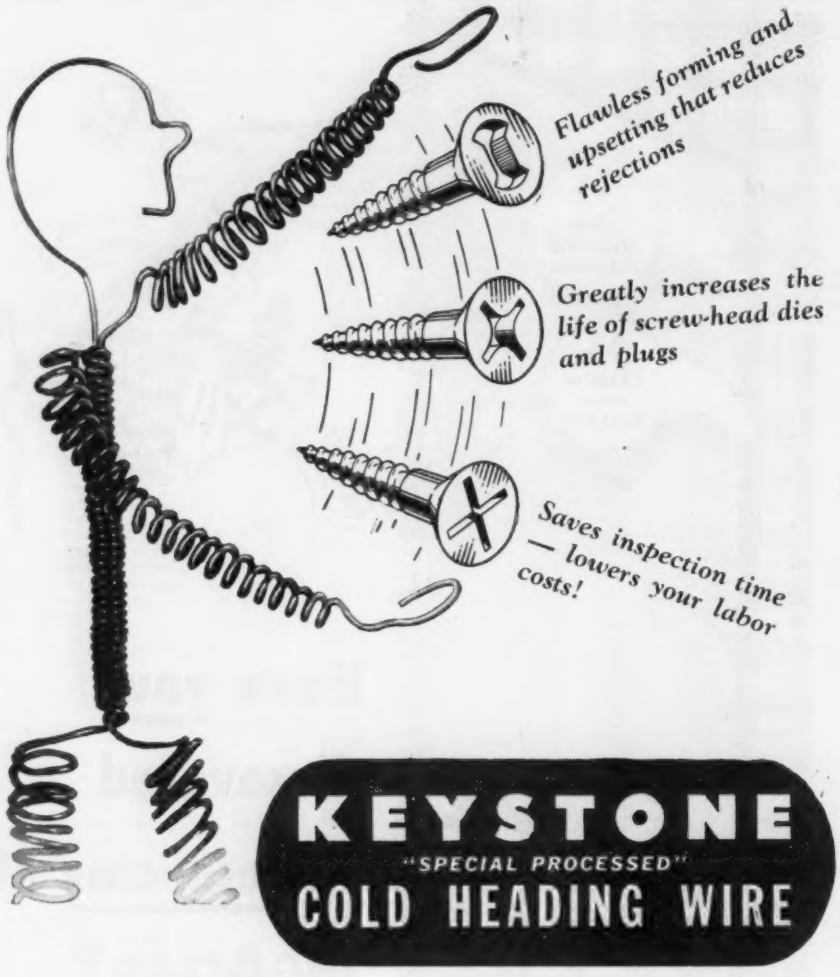
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cold-rolled sheets, but has not opened books for second quarter. Other sellers are booked well beyond.

Alan Wood Steel Co., Conshohocken, Pa., plans to get its new hot strip mill into operation early in January and is booking some tonnage for shipment that month. The mill has a capacity close to 20,000 tons a month.

Backlogs on stainless sheets and strip are increasing as result of improved demand. Most sellers are quoting around four to six weeks, although one large producer of stainless strip has jumped its delivery promises to around 13 to 14 weeks.

Boston—Only in pipe and flat-rolled are steel consumers seriously concerned with supply. Sheets, notably cold-rolled, are more extended than strip. First quarter schedules for carbon sheets are filled with some overflow into second. Spurt in sheet buying, partly growing out of production suspensions, is substantially based on inventory replacement by industrial users and warehouses; actual tonnage consumed is not much heavier. Any increase in hot-rolled prices will be immediately reflected by an advance in cold-rolled strip.

Cincinnati — District sheet mills have not set up first quarter schedules, but the backlog of orders makes certain a tight supply situation into early 1950. Pressure for deliveries has not relaxed. Even shutdowns by some automotive interests have not decreased demand. The situation in stainless is easier than during the strike.

Chicago—One of two policies has been followed by consumers during and since the strike: (1) Use every available piece of material and turn out as many finished products as possible; (2) curtail operations to stretch supplies over a longer period in hope inventory rebuilding won't be too difficult. A few plants which closed completely for lack of steel or components, have resumed operations. With gray market sheets available in the 8 to 9-cent range, some plants threatened with closure may take these offerings.

On top of pressure for steel to meet production requirements is demand from consumers rebuilding inventory. One factor adding to this demand is the nearing yearend. For tax purposes, inventories should be brought up to a normal level.

Buying for second quarter is not so active and some mills will not officially open books for that period until carryover is determined. No orders for galvanized sheets have been accepted at one mill since the strike, the arrearage taking the producer beyond March. Means of expanding and modernizing the galvanizing facilities of one district producer are under consideration.

Continental Steel Corp., Kokomo, Ind., increased galvanized sheet prices $6 per ton to $4.80 mill for No. 10 gage, effective Dec. 1.

Birmingham—Indications are sheet supplies will continue tight well into 1950. Demand is insistent. Customers are being supplied on an allocation basis.

St. Louis—Sheet demand is increasing sharply and the total is estimated at 30 per cent over the district's rolling capacity. Nearly all

types of manufacturers are pressing for deliveries. Rolling schedules are filled through first quarter; second quarter books will not be opened for some time. New demand is especially strong from the construction, farm implement and auto industries. General Motors is sending slabs from Detroit and Chicago to Granite City Steel Co. for conversion.

Los Angeles—Sheet and strip demand is heavy, with consumers scrambling to replenish depleted inventories. Producers are booked through most of first quarter on cold-rolled strip and are quoting April or later on hot and cold-rolled sheets.

San Francisco — All flat-rolled items are scarce; strip and galvanized sheet shortages are critical. Most fabricators are operating hand-to-mouth, and warehouse stocks are virtually gone.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 159

Boston—Concrete bar reinforcing steel requirements hold at high level, bridges and other public works accounting for bulk of demand. Distributors' and fabricators' stocks are limited. Housing needs are high.

Seattle—Rolling mills are operating at 50 per cent of capacity. Business is slow and no large projects are up for bids. Some small contracts of less than 100 tons each are reported.

Plates . . .

Plate Prices, Page 159

Philadelphia—While plate demand continues dull, it is holding steady compared with a week ago. Most district mills are offering some tonnage for shipment before yearend, mostly in the heavier gages. Demand for pressure tanks remains light. Power plant needs are fairly active.

Pennsylvania Railroad placed orders for plates and shapes for car repairs at Altoona, Pa., where a number of employees are being recalled. In general, railroad requirements are light.

Boston—Except for a bulge in large diameter pipe tonnage, plate demand is not impressive. Fabricating shops are operating off inventory, buying fill-in needs for prompt shipment. Part of pipe tonnage for Boston Metropolitan district water lines is being fabricated by Walsh-Holyoke Steam Boiler Works. With three to four weeks delivery frequent and competition for orders sharp, there is little forward buying with January schedules wide open on some mills.

Birmingham—Demand for plates is sustained. Bookings are not as heavy as had been anticipated, but there is sufficient business to support production as near capacity as ingot supply permits. Shipments are reasonably prompt.

Los Angeles—Plate requirements have receded, particularly light gages. Needs of jobbers and petroleum companies have lessened.

San Francisco—Demand for light gage plates is beginning to ease. Supplies in most instances are ample reflecting in part a seasonal letdown in buying.

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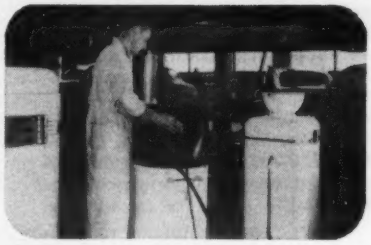

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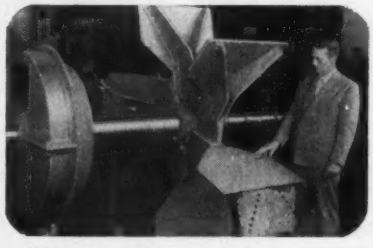
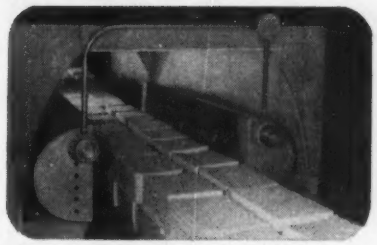


3 . . . heating surfaces which, in turn, heat something else. Typical of the applications shown in the film is this sludge-drying fan (above) where electric heaters are clamped between the blade sections. A simple application, yet completely effective!



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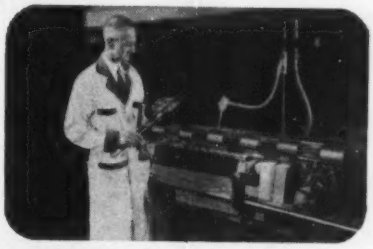

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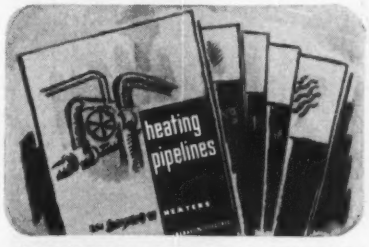

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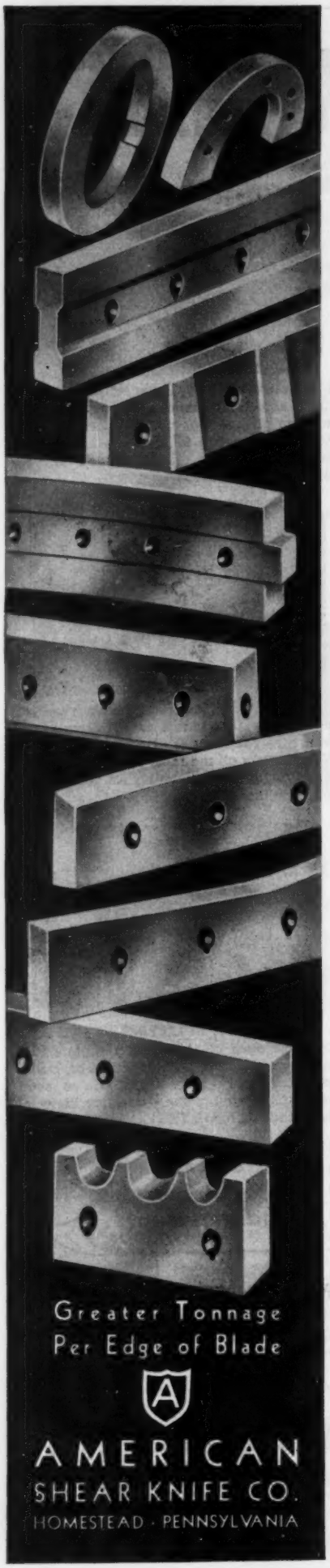

Steel Bars . . .

Bar Prices, Page 159

Boston—Orders placed during the steel strike are being delivered, indicating deferred tonnage on hot-rolled carbon bars has been about cleared; promised shipments against new orders are around four weeks. Commitments for January delivery lag and there are openings in schedules for that month on some sizes and grades. Cold finishing mills are operating at lower rate with fairly balanced inventories for shipment from stock in most cases. Bulk of defense contracts being placed in this territory are for aircraft, including two for engines placed with United Aircraft Corp.'s, Pratt & Whitney Division, East Hartford, Conn., totaling $20,783,000. Springfield Armory closes Dec. 19 on approximately 700 tons alloy steel barrel blanks.

New York—Most consumers of plain carbon bars expect to balance working inventories by early January. Producers usually are able to supply hot-rolled on new orders within four to five weeks; three to four weeks on most sizes of cold-draw material. Some cold drawers have fair inventories on which they can bank for virtually prompt shipment. Cold and hot alloy steels are available within a month on the average.

Pittsburgh—Acceptance of alloy bar orders is unrestricted with openings available in December schedules. Merchant carbon bar deliveries are extended two months although output in some instances exceeds the prestrike pace. At midweek one cold-finished bar producer here was still idle; while production schedules of other interests are retarded by inability to gt enough hot-rolled steel.

Philadelphia—Hot carbon bar requirements continue to ease. Most producers can make deliveries within four to six weeks. At present, warehouses and cold drawers are among the more active buyers, and even their inventories are being rounded out rapidly. Forgers are doing relatively little. Some drop forgers are operating at no more than 25 per cent; most others, not more than 40 per cent. Heavy forgers are practically out of the market.

Cleveland — Hot-rolled carbon bar demand is holding up well. Mills expect to get current with demand no later than mid-first-quarter. Sellers will enter 1950 with substantial backlogs, but they are booking tonnage for first quarter shipment. Heavy buying from the automotive and parts industries is anticipated. Current slowdown in auto assemblies, due to steel inventory replenishment and model changeoyers, has not affected bar demand. Mid-December is expected to see most auto assembly lines again rolling. The situation in cold-finished bars is somewhat mixed. Some sellers can give prompt delivery from stock; others, from four to eight weeks or more. Alloy bar tonnage is freely available.

Birmingham—Demand for bars is heavy. General repair work, bridge and other construction programs are taking large tonnages of reinforcing.

San Francisco—Bars supplies are generally ample for all needs, cold-finished bars being in especially large supply.

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Wire . . .

Wire Prices, Page 161

Boston—Less wire volume originally booked for fourth quarter delivery will be carried over into first quarter than earlier predicted; mills are making headway against deferred volume, although hampered in some cases by lack of balance in rods. Consumers are placing orders for first quarter in good volume and schedules for that period on some specialties are about filled. Screw manufacturers are covering and other wire users are getting inventories into balance. Automotive requirements are holding up surprisingly well.

Pittsburgh — Critical shortage of wire rods and finished wire items was dealt another blow last week with complete shutdown of operations at the Monessen, Pa., plant of Pittsburgh Steel Co. over a work schedule dispute. Sellers' backlogs of most wire items extend two to three months. Warehouse stocks of merchant products are unbalanced and below desired levels, notably in nails within popular size ranges. A seasonal improvement in demand for fencing and barbed wire is anticipated.

Cleveland — Several isolated advances over the past two months have given rise to speculation as to the probable price trend on wire products in first quarter. Latest increase effected was that last week by Seneca Wire & Mfg. Co., Fostoria, O., which raised its quotations $10 per ton on 16-gage wire, now quoting annealed stone $9.65 and galvanized stone $11.15. Wiremakers' order backlogs are substantial, but with production rapidly attaining prestrike level, some easing in demand is anticipated.

Birmingham—Wire products continue to move in good volume, because of unseasonably warm weather. Nails are more readily available. Baling and fence wire is in steady demand.

Structural Shapes . . .

Structural Shape Prices, Page 159

Boston — Bridge inquiry is up slightly. Commercial and industrial building is at a low point. District fabricating shop backlogs are lower.

Estimated total bookings of fabricated structural steel for October increased to 158,120 tons, a new high for the year to date, reports American Institute of Steel Construction. Due to the steel strike, October shipments dropped to 95,350 tons, or 41 per cent less than September's shipments. For the first 10 months, shipments amounted to 1,596,394 tons, compared with 1,641,736 tons for the like 1948 period. Tonnage available for fabrication within the next four months totals 583,580 tons.

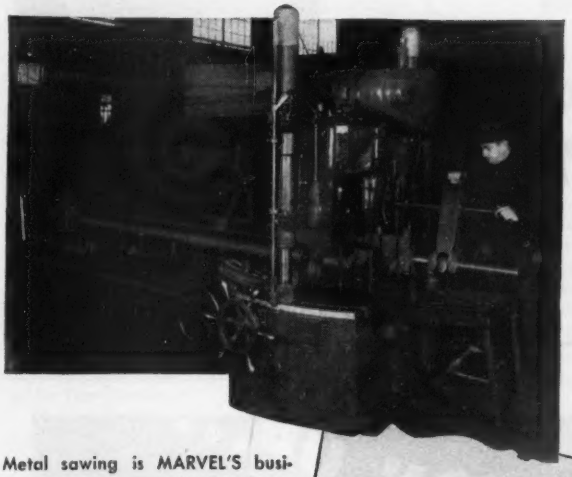
Philadelphia—Substantial amount of structural, principally public work, appears in the making for action after turn of the year. Relatively little tonnage is being placed currently. Backlogs at fabricating shops are shrinking and some fabricators are competing sharply for tonnage. Deliveries on standard shapes range around four to six weeks; on wide flange sections, seven to 10 weeks.

Cleveland—Activity in structural steel market is limited to small jobs with standard shapes available for early delivery and with wide flange sections taking better than two months. Fabricators are actively looking for work but seasonal influences are a factor which cannot be hurdled. Long-term work prospects in this area were brightened last week by announcement of 19 proposed postoffice building projects in Ohio costing around $23 million.

Cleveland is slated to get a postoffice annex and garage, the former costing $8.5 million and the latter $1,960,000, including sites. At Akron a $4.1 million project is planned; at Dayton one for $4.8 million; at Mansfield, $1,030,000; Toledo, $1,450,000. Postoffice buildings also are slated for Cincinnati, Hicksville, Milford, Carey, McArthur, Oak Hill, Somerset, Rittman, Toronto and St. Mary's.

Los Angeles—Structural trade is moderate, and supplies are adequate. Nevertheless, steel construction is hitting a record pace in some categories. A builder of distribution facilities for oil companies has a record volume of orders.

Seattle—Fabricators report seasonal recession, no new business of importance being placed. Awards consist of jobs involving less than 100 tons each. Little improvement is expected until January. Inventories will carry over the yearend. Several Washington and Oregon bridge jobs



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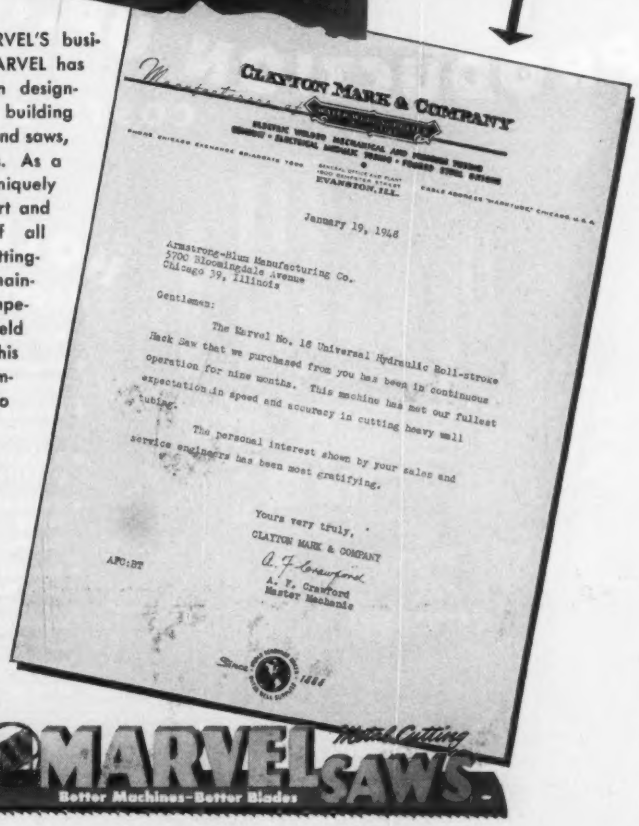
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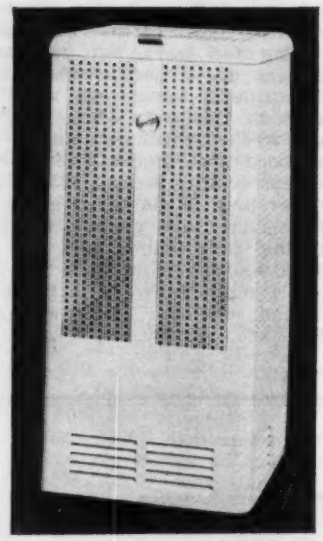

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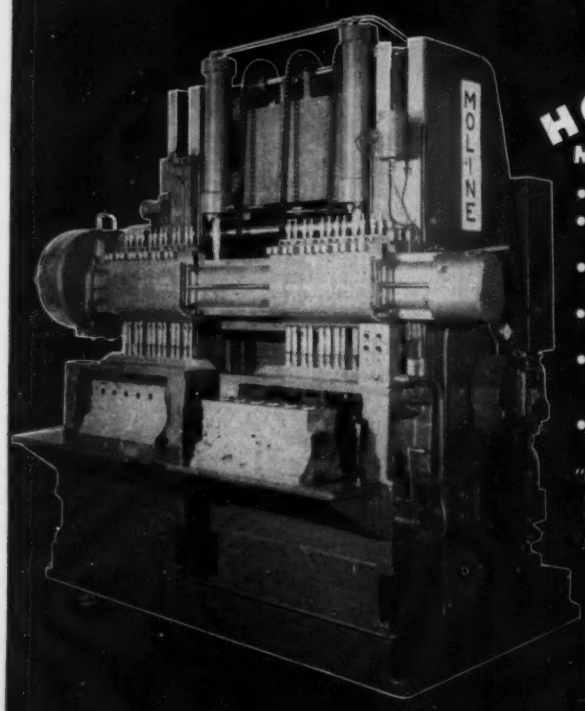

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and highway projects are expected out for figures soon, having been held back because of the steel strike.

San Francisco — Inventories of shapes in fabricators' and warehouses' hands are adequate to meet demands at current rate of construction. Wide flange sections are scarce. Private building, although still lagging, is showing signs of a pick-up. Considerably more activity is expected next spring.

Tubular Goods . . .

Tubular Goods Prices, Page 162

Pittsburgh—Encouraging progress toward return to full scale output of pipe and tubing in this district was interrupted last week as a result of cessation of operations at the Monessen, Pa., plant of Pittsburgh Steel Co. due to a labor dispute. Producers' order backlogs represent four to six weeks capacity output for pressure mechanical tubing, with deliveries further extended for larger sizes. There is little distinction in order backlogs between carbon, stainless and alloy tubing.

Philadelphia—Pipe is in almost as critical demand as sheets. No easing in requirements appears in prospect. A major readjustment in sheets, thus freeing steel for other purposes, would have a bearing. Prices continue steady and no sweeping changes in the near future are indicated.

Los Angeles—Although oil industry specifying is slow, pipe requirements generally are heavy, especially for diameters up to 4-in. Jobber, utility, and residential construction buying is active, and pipe mills are booked through first quarter.

Seattle—Cast iron pipe market is quiet and no improvement is expected for 60 days.

Semifinished Steel . . .

Semifinished Prices, Page 159

Youngstown—Increase of $5 per ton on sheet bars, billets and slabs to $57, effected Nov. 22 by Sharon Steel Corp. has not been followed by other sellers. Henry A. Roemer Jr., executive vice president of Sharon said the increase was due to rising cost of scrap, fuel oil and other raw materials.

Mill Equipment Exports Rise

Pittsburgh—Large order backlogs assure high level operations among steel mill equipment builders well into 1950. Considerable headway has been made against bookings in recent months. Steel industry expansion in foreign countries accounts for a major portion of equipment order backlogs. A number of foreign programs are still in negotiation stage. One of the most recent awards went to E. W. Bliss Co. for rolling mill facilities for Italy. A cold-reduction mill is under consideration for Linz, Austria, while a 24-inch reversing hot-strip mill is scheduled for operation early in 1950 at the Belga Mineira Co.'s plant in Argentina. A completely integrated steel plant in India is expected to be formally approved early next year.

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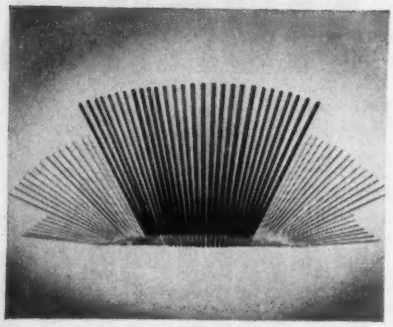

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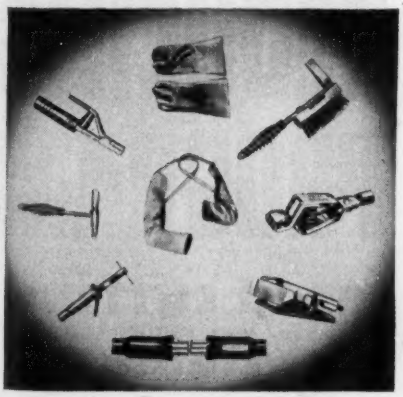

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Advertisement

Warehouse . . .

Warehouse Prices, Page 163

Cleveland—Local steel distributors are disappointed at the small volume of new buying. They had expected a pickup following the steel strike. So far it has not appeared. During the strike warehouses did a larger-than-normal volume of business, cutting deeply into inventories which are being replaced, though mill shipments have not yet attained prestrike pace. Isolated advances by mill suppliers have not been reflected at the warehouse level. Except for the light flat-rolled products sluggish demand is expected over the remainder of the year.

Pittsburgh — Distributors' receipts from mills since termination of the strike are larger than had been expected, materially improving unbalanced inventory position reported earlier last month. Joseph T. Ryerson & Son Inc. is still closed by strike here, aggravating the steel shortage problem among warehouse steel consumers. Demand for warehouse steel items, excluding galvanized and cold-rolled sheets and wide flange beams, is disappointing. There is little difficulty in meeting warehouse steel demand for carbon and alloy bars, plates, standard structural items and stainless steels.

New York—Demand for warehouse steel is lower and November volume was well under October. Inventories, with exception of flat-rolled and pipe, are not badly depleted; replacement pressure is largely for sheets, current buying of which is slower. Only on flat-rolled are distributors pressing mills for tonnage.

Philadelphia—Warehousemen look for a further decline in orders this month. Business in November was down appreciably from October when consuming pressure was strong due to the steel strike. Most warehousemen say, however, that November business was fairly good, even though on the downside. Distributors of cold-rolled sheets are now quoting 6.49c, city, and 6.24c, country, for 15 gage. Previously there had been a spread of 6.45c to 6.49c and 6.20c to 6.24c, respectively.

Cincinnati—Some warehouse interests have received heavy mill shipments since the strike, so that the pinch in steel is being relieved. A strike at a major district interest, however, is curbing overall supply. Demand continues active, although pressure for shipment is off from recent peak.

Los Angeles — Activity at warehouses has tapered, although it exceeds slightly the prestrike level. Warehouse stocks are short in hot and cold-rolled and coated sheets, and cold-rolled strip. Reinforcing supplies are improved. Distributors are placing substantial mill orders in their out-of-balance categories. Less price-cutting is in evidence.

San Francisco—Warehouse activity has turned sluggish. A sudden let-up in demand is ascribed to seasonal factors and to resumption of deliveries from mills. Heavy demand for strip and galvanized sheets is noted, but warehouse supplies are practically exhausted. Inventories of most other items are plentiful.

Seattle — Warehouse volume has

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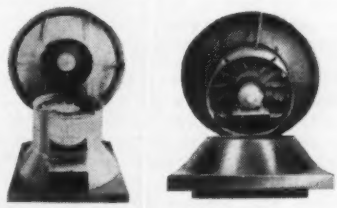

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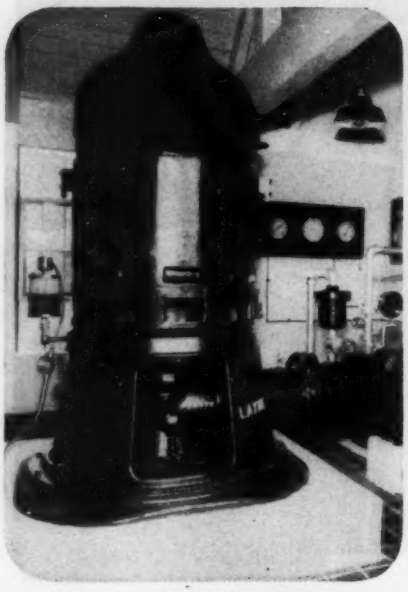

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dropped sharply due to seasonal factors. Galvanized sheets continue the most critical item and this situation has created a good demand for aluminum which is being used as a substitute.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 163

Cleveland—Substantial volume of new business is being booked and figured by industrial fastener producers. As a result, the trade anticipates an active first quarter. Operations at bolt and nut plants are rising. One producer, who had been operating on a curtailed basis, has gone to a 40-hour week and hopes to put on another shift shortly. Steel shipments from mills are rising. Some fastener makers' steel inventories became badly unbalanced during the steel strike and they had to borrow and trade metal with fellow producers to maintain operations.

Pig Iron . . .

Pig Iron Prices, Page 158

Cleveland—Some slight increase in merchant pig iron demand has followed in the wake of the steel strike settlement. But foundries are not stocking iron in more than usual amounts, anticipating adequate supplies with production again close to prestrike level. Some apprehension with respect to coke supplies is noted due to the uncertainties in the coal mining situation.

Pig iron prices are firm and prevailing view among consumers is that the market will hold steady for some time to come.

Boston—Pig iron volume, off close to 10 per cent in November, is likely to coast at current reduced rate during balance of 1949. Several larger consumers will probably revise melt downward again next quarter unless additional orders for castings develop, notably with textile mill equipment shops. Slack is confined to foundry grades, consumption of basic holding and slightly increased in spots.

Pittsburgh—Demand for pig iron continues heavy among foundries serving the enamelware and radiation industries. Some improvement is noted among foundries producing castings for electrical appliance products; also among ingot mold producers. Orders received by foundries serving the railroad industry remain at disappointing level, although some improvement is indicated for first quarter of 1950. Leading merchant producer here is shipping its entire output and expects this situation to be continued through January at least. The Struthers, O., furnace may be blown in if iron demand continues heavy into first quarter.

Philadelphia—Demand for foundry iron is spotty and quiet. Buying in November was down noticeably from the preceding two months, although better than during midsummer. No important improvement is anticipated for December as most consumers have fair inventories.

Buffalo—Despite the high rate of pig iron production, leading merchant sellers report only moderate demand

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from foundries. Operations are sustained by the considerable amount of current output which is moving into storage at terminal points and the fair amount which is moving up the lakes to motor casters. An increase in basic production is also expected.

Cincinnati—An easier supply situation in pig iron and coke has failed to bring about any upturn in the melt.

Birmingham—Pig iron production is at capacity, but still behind demand as operations in consuming industries improve.

St. Louis—After four months of idleness, B furnace at Koppers Co. in Granite City, Ill., was blown in last week to raise the two stacks' output to 1000 tons daily. Though the company's coal shipments from West Virginia are not back to normal, and some uncertainty remains as to future supplies, demand virtually forced resumption of full operations. Koppers' ground stocks were low and orders have been increasing from a few large foundries whose inventories were badly depleted. A few small jobbing foundries have been coming back strong.

Scrap . . .

Scrap Prices, Page 166

Pittsburgh—Post-strike upturn in scrap quotations ended abruptly last week with sale of No. 1 heavy melting at $32, off $2. Mills continue to register little interest in re-entering market for large tonnages, leading to conjecture present weakness in price structure may soon breakthrough to still lower levels. Machine shop and mixed turnings supply is well in excess of demand reflecting accumulations during strike period. Crushers are able to purchase these items at about $1 below previous quotations. Machine shops turnings hold at previous prices. No. 1 cupola cast sold within range of $35-36, off $2.

Philadelphia — Weakness in steel scrap has resulted in a decline in No. 1 heavy melting steel to $25.50 to $26.50, delivered, and a drop in No. 1 bundles to $26. Electric furnace bundles are off $1 to $26 to $27; heavy turnings to $25 to $26. Cast scrap prices are unchanged, except unstripped motor blocks, which are slightly higher at $30 to $31.

Boston—Decline in demand is accompanied by weaker prices for steelmaking scrap, several grades being off $1 to $2 a ton. As the market turned easier shipments were heavy, but loadings currently are light. Busheling, turnings and bundles followed heavy melting grades in the reaction. Cast scrap is inactive and prices are down $1 to $2.

New York—Steel mill scrap is coming out much more freely, with the general tone weak. Brokers' buying prices are off on No. 1 heavy melting steel and No. 1 bundles to $22-$23, f.o.b. shipping point; on No. 2 heavy melting and No. 1 busheling, $19-$20; No. 2 bundles, $18-$19. Punchings and plate scrap, cut structurals and electric furnace bundles are down $1 to $22-$23. Turnings and mixed borings and turnings are unchanged; all cast grades are also unchanged.

Cleveland—Undertone of the scrap

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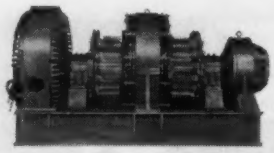

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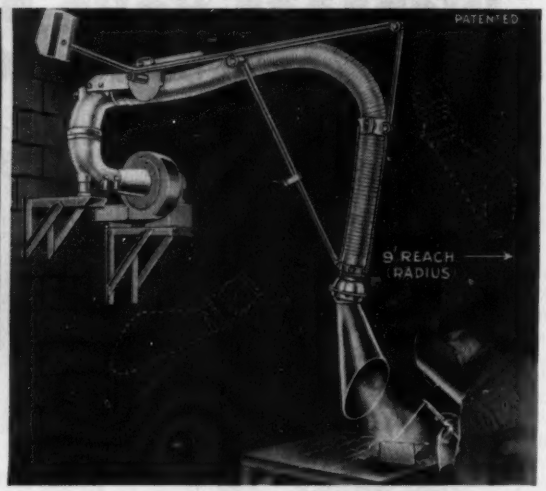

(Right) Collecting fumes with a Ruemelin Fume Collector.

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market is weak, due to lack of buying by the mills. At the same time, there is no distress selling and the comparatively high prices paid for the New York Central tonnages tend to bolster market sentiment. Many large producers of scrap have curtailed operations and are shipping smaller tonnages than they did earlier in the year. Most scrap interests do not expect mills to re-enter the market for larger tonnages until after the turn of the new year; others believe current high steelmaking operations will cut into mills' reserves rapidly, forcing them to make new commitments in late December. With additional sales in the Youngstown district at $33, prices here are unchanged on the basis of $30-$30.50 for No. 1 heavy melting.

Buffalo — Steadiness characterized the scrap market last week as dealers were busy covering recent orders. With a number of dealers participating in recent sales, the total business aggregated in the neighborhood of 25,000 tons. Dealers reported no difficulty finding offerings to cover commitments. Turnings and borings maintain strength on sales taking place in Niagara Falls. Interest is still apparent in the cast market with No. 1 cupola quoted $36-$37, while No. 1 machinery is $39.50-$40.

Chicago—Only grades showing any activity here are blast furnace items, a few brokers for the first time in several weeks making offers to dealers at $1 to $1.50 higher levels. At the same time, other brokers reduced offering prices, leaving the market in a state of flux. Open-hearth material has moved out of dealers' yards in only minute quantities since the strike and gloom is becoming more pronounced among traders. Stagnation is so complete dealers in many cases can get no indication from brokers as to price at which material would be bought.

Cincinnati—Scrap prices are unchanged. Mills, which entered the market immediately after strike, are now backing away. Tonnage is coming out in good volume, some of it from dealers who had been building stocks on speculation. Demand from steel foundries has faded, but there is spotty improvement in buying by gray iron melters.

St. Louis—No. 1 and No. 2 heavy melting steel prices rose $1 last week on urgent purchases from at least two mills here whose scrap piles had dropped below 20 days' needs. So much scrap is going to other steelmaking centers on prestrike and new orders this district is beginning to feel the pinch.

Seattle—Bethlehem Pacific Coast Steel Corp. has withdrawn from the scrap market and plans no further purchases until after Jan. 1, meanwhile drawing on inventory. The smaller mills are buying sparingly.

Birmingham—Scrap prices are unchanged with heavy melting $27. Buying is moderate and a considerable accumulation is noted in local yards.

Los Angeles—Scrap demand is heavier, although prices are unchanged. Dealers report an increase in mill inquiries, and anticipate a near-term increase in demand for melting steel.

San Francisco—District mills have not re-entered the scrap market on

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Iron Ore . . .

Iron Ore Prices, Page 163

Cleveland—Lake Superior iron ore shipments are being maintained at a moderate rate and are not expected to show much change over the balance of the season. Shipments totaled 342,832 tons for the week ended Nov. 28 against 1,589,731 for the like week a year ago, reports Lake Superior Iron Ore Association, this city. Total for the season to Nov. 28 is 69,186,233 tons, or about 13 million tons under the like 1948 figure.

Republic Steel Corp., Youngstown Sheet & Tube Co., Armco Steel Corp., Wheeling Steel Corp., and National Steel Corp. are participating with Hanna Coal & Ore Corp. and Canadian interests in the development of Quebec and Labrador ore ranges. A new Canadian company, Hollinger-Hanna Ltd., will manage the operation, and an American company, Iron Ore Co. of Canada, will finance the undertaking.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1600 tons, Star City bridge, Monongahela river, Monongahela county, West Virginia, to Bethlehem Steel Co.

1400 tons, power plant, Booth Point, Fla., to O'Neil Steel Works, Birmingham, Ala.

500 tons, hospital addition, Harrisburg, Pa., to Standard Equipment Corp., that city.

200 tons, plant addition Puget Sound Pulp & Timber Co., Bellingham, Wash., to Isaacson Iron Works, Seattle; Howard S. Wright Co., Seattle, general contractor.

200 tons, experimentor reactor plant, near Arco, Idaho, to Judson-Pacific-Murphy Co., Emeryville, Cal., low $32,073, by Atomic Energy Commission.

130 tons, building additions, state hospital, Foxboro, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; John Copobianco, Boston, general contractor; Northern Steel Co., Boston, awarded concrete reinforcing bars.

STRUCTURAL STEEL PENDING

2820 tons, superstructure, suspension bridge, Atchafalaya river, near Melville, La., for Transcontinental Gas Pipe Line Corp., Houston; American Bridge Co., Pittsburgh, low.

1500 tons, rebuilding Sullivan Square structure, Boston; bids postponed from Dec. 6 to Dec. 12, State Department of Public Works, Boston.

1250 tons, also 125 tons reinforcing, Chief Joseph dam bridge, Columbia river; general contract to Guy F. Atkinson Co., Seattle, low $946,200.

510 tons, three state bridges, Derby and Shelton, Conn., on Shelton-Derby-Ansonia expressway; Mariani Construction Co., New Haven, low on general contract.

350 tons, state bridge, Kent Island, Md.; bids Dec. 6.

210 tons, three-span continuous rolled beam bridge, end spans 50-foot each with 63-foot center span, Fulton terrace, New Haven, Conn.; bids Dec. 12, Hartford, Conn.

100 tons, state bridge, single span, composite deck welded web girder structure, Shelton-Derby-Ansonia expressway, Shelton, Conn.; Mariani Construction Co., New Haven, low on general contract.

110 tons, 150-foot two-span continuous rolled beam bridge, Glastonbury, Conn.; bids Dec. 12, Hartford.

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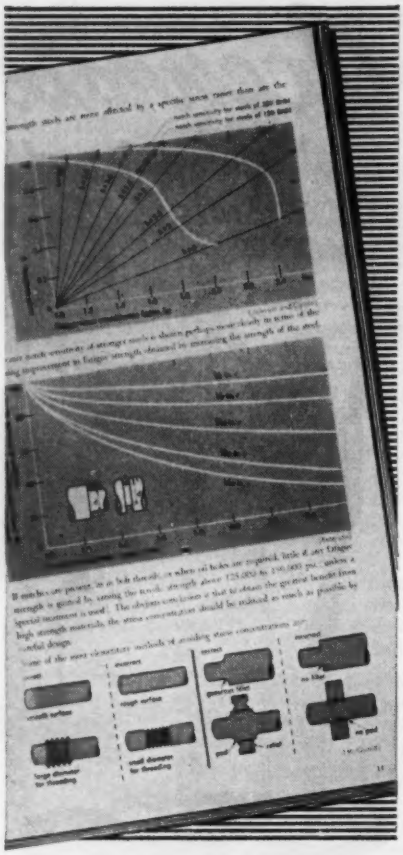

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water river bridge, Lewiston, Idaho; Hansen & Parr Construction Co., Spokane, Wash., apparently low, $184,481.

Unstated, miscellaneous steel items, Coulee power plant; bids to Bureau of Reclamation, Dec. 10; Spec. No. 2841.

Unstated, steel towers, etc., Jim Creek Navy communications center, Washington state; Electrical Construction Co., Portland, Oreg.; low $130,000.

Unstated, lattice pole-type transmission towers, sch. No. 4900 and 4901 respectively; bids to Bonneville Power Administration, Portland, Oreg., Dec. 21 and 22 respectively.

Unstated, towers and other items, capacitator bank, Alcoa substation; bids early 1950 to Bonneville Power Administration, Portland, Oreg.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, veterans' housing project, Brighton district, Boston, to Northern Steel Co., Boston; John Bowen Co., Boston, general contractor; Groisser & Shlager Iron Works, Somerville, Mass., awarded fabricated structural steel.

175 tons, Sherman iron mine, Virginia, Minn., to United States Steel Supply Co., Chicago.

100 tons, pulp plant addition Bellingham, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Howard S. Wright Co., Seattle, general contract.

100 tons, Peoria street bridge, Chicago, to United States Steel Supply Co., Chicago.

REINFORCING BARS PENDING

1160 tons, Southwest trafficway, Kansas City, Kan.; bids asked.

750 tons, 14½-mile extension west canal, Columbia Basin project; bids to Bureau of Reclamation Dec. 21.

230 tons, classrooms, University of Minnesota, Minneapolis; bids asked.

200 tons, school, Wayzeta, Minn.; bids asked.

170 tons, hospital, Rochester, Minn.; bids asked.

102 tons, Lincoln school, Fremont, Minn.; bids asked.

100 tons, waterworks, Moorhead, Minn.; bids asked.

Unstated, 300,000-gallon water reservoir; bids to East Wenatchee, Wash., Dec. 5.

PLATES . . .

PLATES PLACED

100 tons, oil storage extension, T.A.D. Jones & Co., New Haven, Conn., to Bethlehem Steel Co.

100 tons or more, 8200 linear feet, 36-inch steel pipe, water line, Melrose-Saugus section, Metropolitan District Commission, Boston, to Walsh Steam Boiler Works, Holyoke, Mass.; Gil Wyner Co. Inc., Malden, Mass., general contractor.

PIPE . . .

CAST IRON PIPE PENDING

130 tons, various sizes of cast iron pipe; bids in at Aberdeen, Wash., Nov. 30.

Unstated tonnage, 208,000 ft. of 24 to 48-in. pipe, municipal authority, Chester, Pa.; bids Dec. 15, alternates requested on steel, cast iron and concrete.

RAILS, CARS . . .

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Green Bay & Western, four 1500-hp diesel-electric freight locomotives, to American Locomotive Co., New York.

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CLEVELAND, OHIO

CONSTRUCTION AND ENTERPRISE

MICHIGAN

BAY CITY, MICH.—Francis Engineering Co., Saginaw, Mich., is completing plans for construction of a $5 million sewage disposal system for city.

BIRMINGHAM, MICH.—Giffels & Vallet Inc., Detroit, has completed plans for superstructure for the new plant to be erected here by Dearborn Motors Corp., Highland Park, Mich.

COLDWATER, MICH.—Plans for city sewage disposal plant, estimated cost $1,811,895, are being prepared by Drury, McNamee & Porter, Ann Arbor engineer.

DETROIT—Electroplating Inc., 12440 Main St., metal-coating and copper plating of metals, has been incorporated by Ludwik N. Witkowski.

DETROIT—K-B-C Inc., 22110 W. Eight-Mile Rd., has been formed to manufacture and sell screws and screw products; William C. Knight, 1420 Lincoln Rd., Birmingham, Mich., incorporator.

DETROIT—Delco Tool Mfg. Co., 2160 Hendricks, has been formed to manufacture tools, dies and fixtures; organizer Edward Muchi, 3815 Garfield Ave.

DETROIT—Detroit Harvester Co., 5450 W. Jefferson, has formed Motor State Products Co., same address, to manufacture and sell agricultural implement parts.

DETROIT—O. W. Burke Co. has been awarded a $4 million contract for construction of the Conners Creek power plant superstructure for Detroit Edison Co.

LANSING, MICH.—Christman Co. has been awarded the contract for an addition and alterations to a building in Flint, Mich., for General Motors Technical Division, General Motors Corp.

SAGINAW, MICH.—J. A. Utley Co., Royal Oak, Mich., has the contract for construction of a core cooling building for Chevrolet Saginaw Grey Iron Foundry Division, General Motors Corp.; Albert Kahn Associates, Detroit, architect.

WYANDOTTE, MICH. — George Pinson Steel Construction Co., 1110 McKinley, has been formed by George Pinson, 1755 12th St., as a contracting and building business.

YPSILANTI, MICH.—E. R. Little Co., Detroit, engineer, is preparing preliminary plans for a power plant and connecting services for Michigan State Normal College, estimated cost $1 million.

FERROALLOYS

(*Continued from Page 163*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% **Ferrosilicon:** Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

KRANE KAR handles spare blooms for Blooming Mill, large slabs for Rolling Mill, charge boxes in Open Hearth, bars in Cold Drawn Bar Mill (finally loads them into railroad cars), changes rolls and bumper plates in Steel Strip Mill, and stands by to relieve heavy duty overhead cranes; transports all kinds of loads in Machine Shop, Construction and Maintenance Depts. With clamshell bucket, **KRANE KAR** moves sand in Welding and Foundry Depts., and coke in Coke Dept. *Ask for illustrated Bulletin 89—"How Woodworking Plants Reduce Materials Handling Costs."*

Gas or diesel, 12 to 37 ft. booms or adjustable telescoping booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

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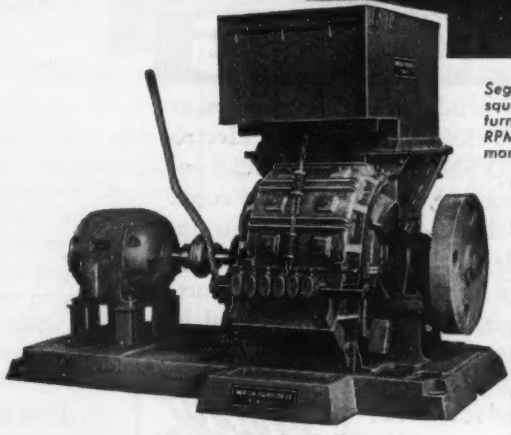
TOP CUTTING-OIL RECOVERY



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Long, curly turnings of steel, alloys, brass, aluminum, etc. are rapidly reduced to easily-handled chips, requiring only a fraction of usual storage space and increasing cutting oil reclamation to 30 to 50 gallons per ton.

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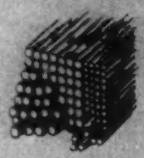

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50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special**

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the Meco LIGHTER COSTS LESS because IT LASTS so much LONGER

Triple flints give three times the life of an ordinary lighter. When one flint wears down, another is quickly and easily rotated into place. In addition every flint wears right down to the metal base instead of breaking off. The big round file not only assures a fat, hot spark every time, but because it can be rotated for wear on all sizes, it outwears a flat file at least four to one — is self cleansing. Handle construction is sturdy, rigid and rust protected. Both file and flints easily and inexpensively replaced. Inquire today!

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- 3/4" Rods
- 3" x 1/4" Flat Bars
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(With four sets of blades)

This hand operated, lever action bench cutter was designed by men long experienced in the metal working fields. They knew the industries' need for a sturdy, portable cutter and they met that need. Sixty years of continuous production tells how well they succeeded.

Same type machine is made in #A and #B size also.

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Send for new circulars on other hand powered cutters, benders, punches.

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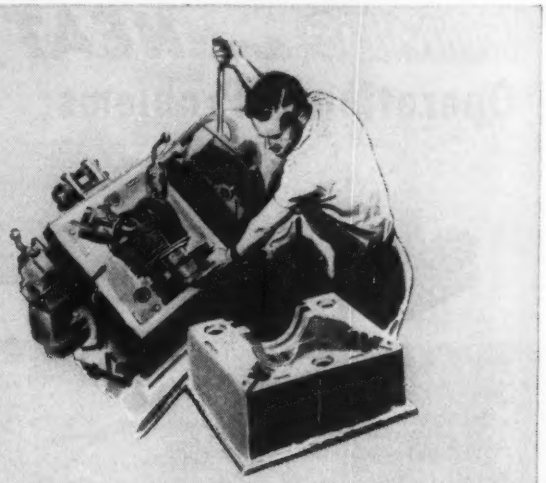

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AIR CONDITIONED EUCLID CRANE

Designed and equipped especially for efficient operation over furnaces or other equipment and machinery where high temperatures and noxious fumes are present. An air-conditioning unit removes dust, cools the air and neutralizes fumes with activated carbon filters. Other special features include: slip ring motors with glass insulation and thermo guards; protective baffle plate under trolley and thermo pane windows.

Write for complete information and specifications.

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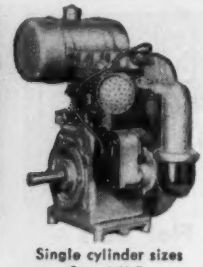
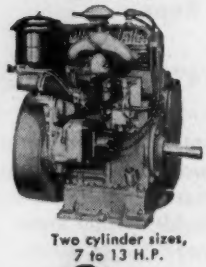
Heavy-Duty Air-Cooled Engines Offer Reputability TO MATCH YOUR OWN . . .



Single cylinder sizes 3 to 6 H.P.



Two cylinder sizes, 7 to 13 H.P.

V-type 4-cylinder sizes, 15 to 30 H.P.

If your company manufactures power-operated equipment of any kind that can utilize engine power within a 2 to 30 Horsepower range . . . your good name is safe when the performance of your equipment is entrusted to Wisconsin Air-Cooled Engines.

Here is reputability to match your own, no matter how high or exacting your standards may be. Every Wisconsin Engine from the smallest to the largest is of heavy-duty design and construction. The perfectly balanced drop-forged crankshaft of every Wisconsin Engine runs on tapered roller bearings at *both* ends to take up end- and radial thrusts . . . a typical detail of Wisconsin heavy-duty design that assures the user "Most H.P. Hours" of on-the-job service.

Wisconsin Heavy-Duty Air-Cooled Engines are available in 4 cycle single cylinder, 2- and 4- cylinder types in a complete power range up to 30 H.P.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 14, WISCONSIN

Grades (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.